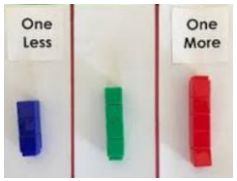
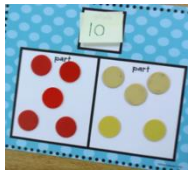
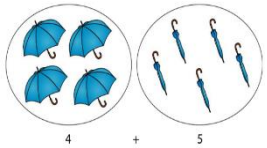
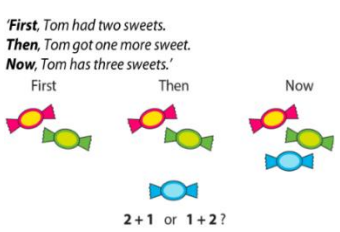
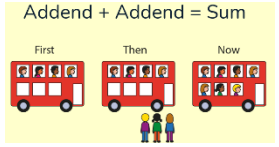
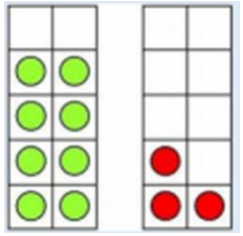
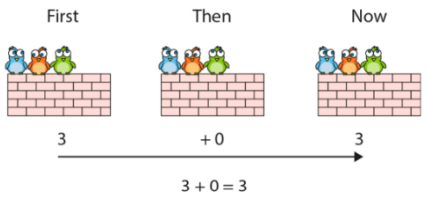
St Michael's

Church of England Primary School

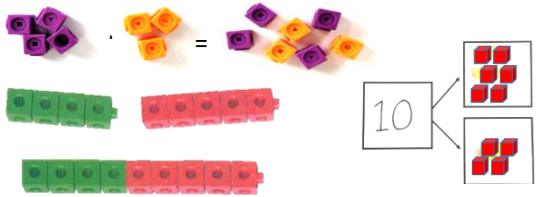
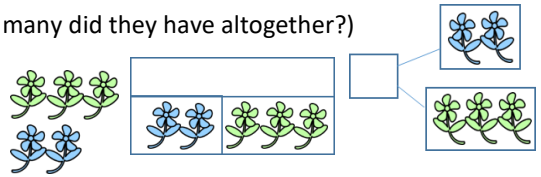
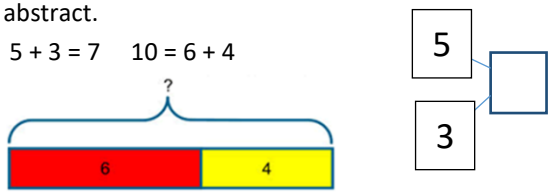
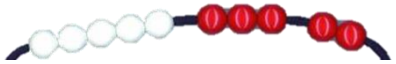
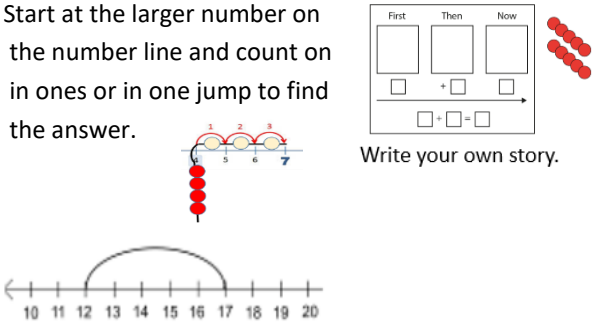
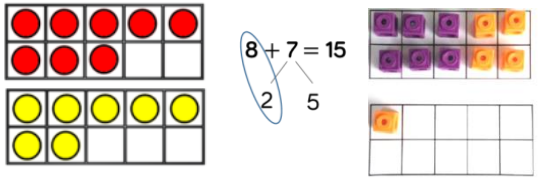
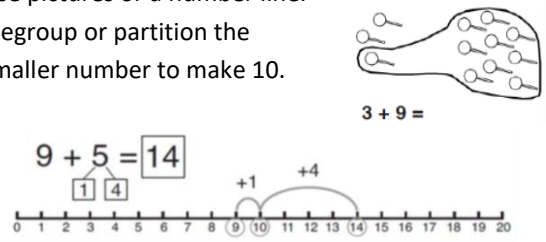
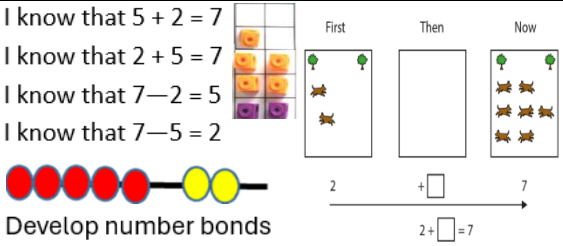
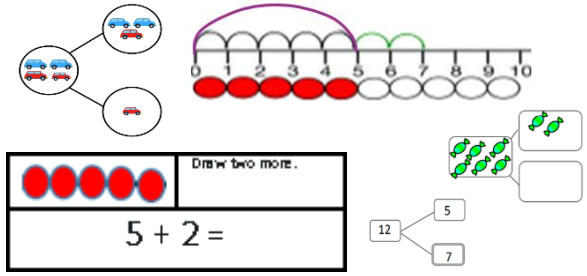
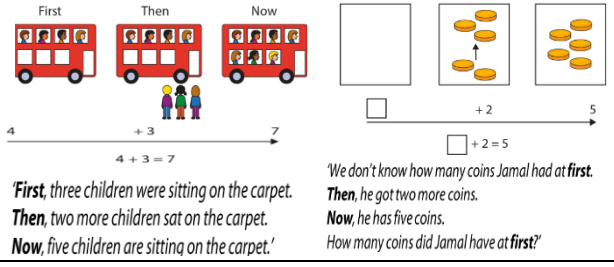
Calculation Policy

"Our vision is for every child to live an abundant life (John 10 -10).
Every child is unique – being different is what we share in common"

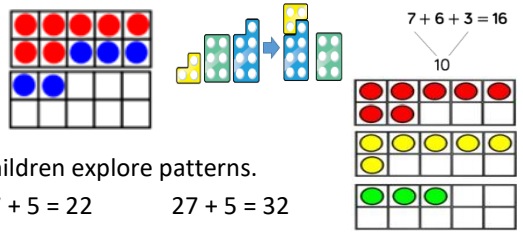
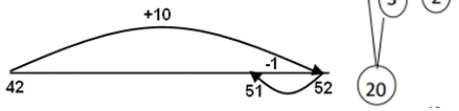
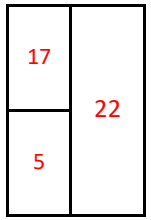
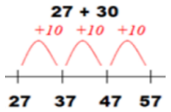
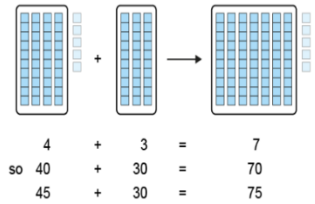
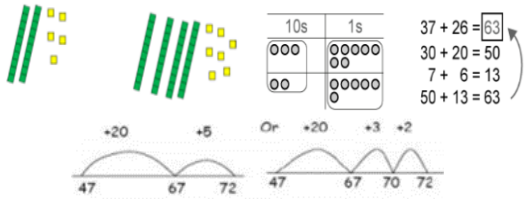
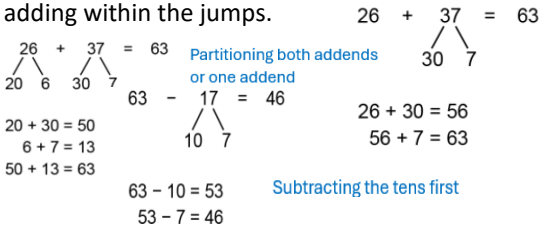
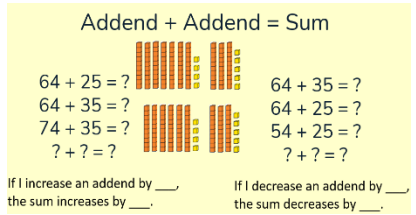
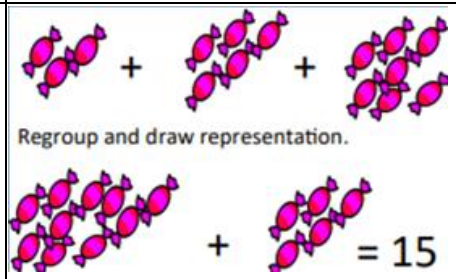
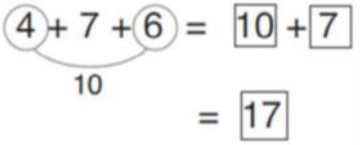
Calculation Policy: Reception Addition

Strategies	Concrete	Pictorial	Abstract
Finds one more than a group of up to five and then up to ten objects and then is able to say one more than a given number to 20. Using quantities and objects they can combine two groups together and give the total.	 	Use a full range of different objects to count and combine - natural objects, seeds, sticks, pine cones, straws, counters, dice, lego bricks, people, small animals etc. Sing songs and rhymes that add on one more each time. Outdoor resources	There is no requirement for children to make written recordings of their work but children can be encouraged to make their own jottings or drawings to explain what they are doing / have done. Model ways to record using standard notation when appropriate.
Using objects they add two single-digit numbers together and can count on to find the answer. Children understand that five fingers on each hand make a total of ten fingers altogether. Children understand that two rows of three eggs in the box make six eggs altogether.	Numicon  Numicon balance for understanding of equals  	 *'There are four open umbrellas and five closed umbrellas.'* *'We can write this as four plus five.'* 4+5 	
Children verbalise the calculations they are doing. Children start to use the vocabulary of addition. 	Ten frames– how many more do I need to add to make 10? 		

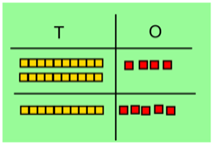
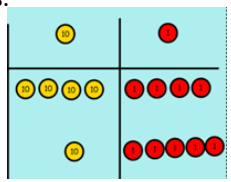
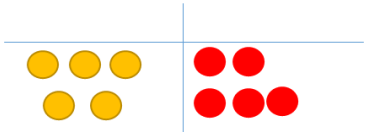
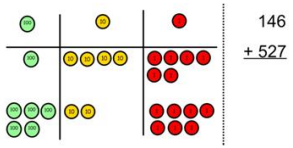
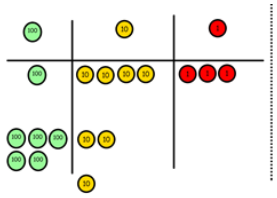
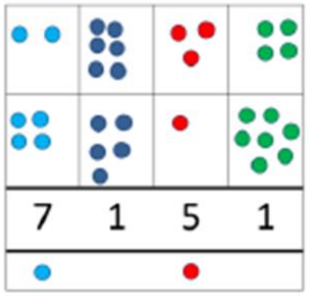
Calculation Policy: Year 1 Addition

Strategies	Concrete	Pictorial	Abstract
Combining two parts to make a whole: Aggregation structure Addend + addend = sum	Use cubes to add numbers together as a group or in a bar model. 	Allow children to pictorially draw a maths question (Mia had 3 green flowers, Mo had 2 blue flowers. How many did they have altogether?) 	Use part-part whole diagrams and pictorial representations alongside the abstract to help children move into the abstract. 5 + 3 = 7 10 = 6 + 4 
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. The string can then be used on a number line, with the big number (in beads) at the starting point. 	Start at the larger number on the number line and count on in ones or in one jump to find the answer.  Write your own story.	Place the larger number in your head and count on the smaller number to find your answer. 5 + 12 = ? 6 + 12 = ? ? = 12 + 7 
Regrouping to make 10. This is an essential skill for column addition later on.	Start with the bigger number and use the smaller number to make 10 first. 	Use pictures or a number line. Regroup or partition the smaller number to make 10. 	If I am at seven, how many more do I need to make 10. How many more do I add on now? 7 + 4= 11
Augmentation and reduction structures (First….then….now) A quantity is increased or reduced by a certain amount	I know that 5 + 2 = 7 I know that 2 + 5 = 7 I know that 7—2 = 5 I know that 7—5 = 2  Develop number bonds and related facts.		The addend is increased 

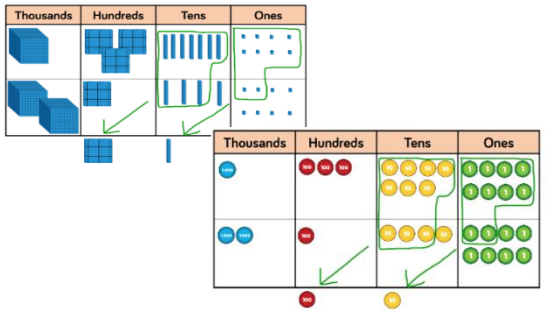
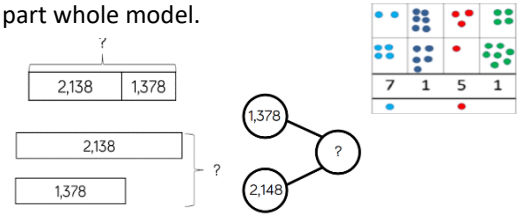
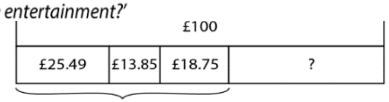
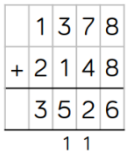
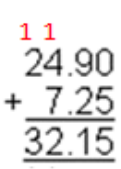
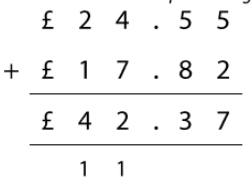
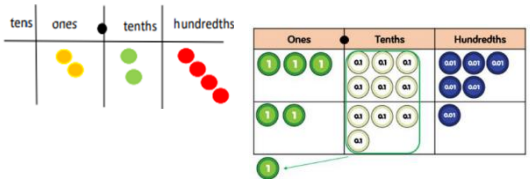
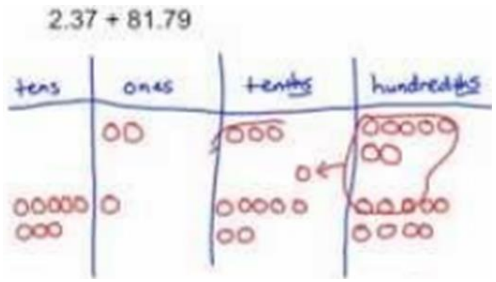
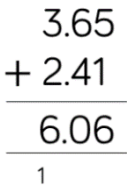
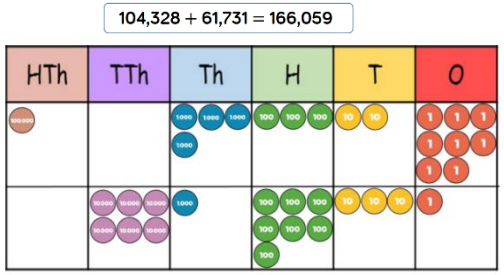
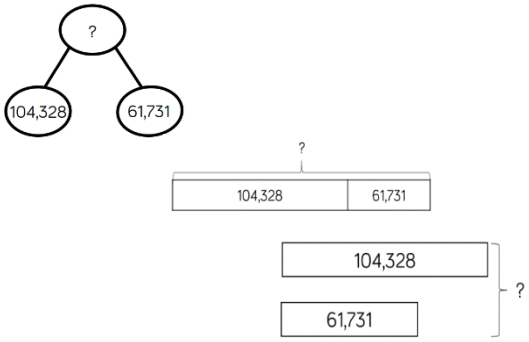
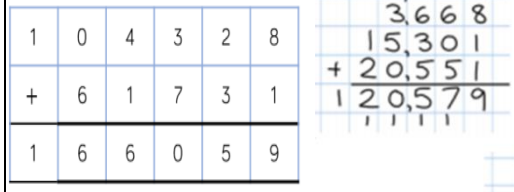
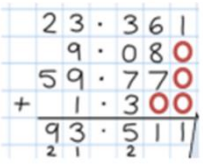
Calculation Policy: Y2 Addition

Strategies	Concrete	Pictorial	Abstract
Add a two digit number and ones Addend + addend = sum	Encourage children to make 'magic ten.'  Children explore patterns. 17 + 5 = 22 27 + 5 = 32	Use part-part whole and a number line to model. Add 9 by adding 10 & adjusting: **42 + 9 = 51**  	Use pictorial representations alongside the abstract 17 + 5 = 22 Explore related facts 17 + 5 = 22 5 + 17 = 22 22—17 = 5 22—5 = 17 
Add a 2 digit number and tens Add two or more tens numbers	Recognise ten using dienes and bead strings.  42 + 20 = 62 Explore that the ones digit does not change. 	  Explore related facts	27 + 10 = 37 27 + 20 = 47 27 + □ = 57
Add any two 2-digit numbers partitioning	Model using dienes , place value counters, number lines and numicon.  	Use number line and bridge ten using part -part whole if necessary. Drawings of dienes can be adding within the jumps.  	25 + 47 20 + 40 = 60 5 + 7 =12 60 + 12 = 72 or 47 + 20 = 67 67 + 5 = 72 (67 + 3 + 2) Partitioning in different ways 
Add three 1-digit numbers	Combine to make 10 first if possible, or bridge 10 then add third digit using dienes , place value counters, number lines and numicon.	 	Combine the two numbers that make/ bridge ten then add on the third. 

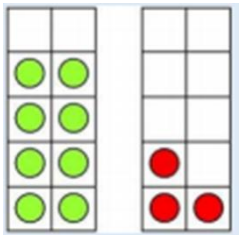
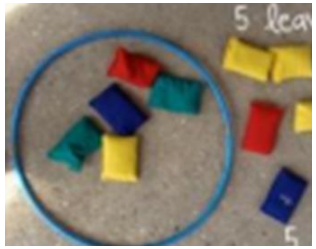
Calculation Policy: Y3 Addition

Strategies	Concrete		Abstract
Column Addition– no regrouping (add two or three 3/2 digit numbers) Partitioning	Add together the ones first then add the tens. Use the Base 10 blocks (dienes) first before moving onto place value counters.  	After practically using the base 10 blocks (dienes) and place value counters, children can draw the counters to help them to solve additions. 	Add the ones first, then the tens, then the hundreds. 2 2 3 + 1 1 4 3 3 7 3 + 4 = 7 20 + 10 = 30 200 + 100 = 300 300 + 30 + 9 = 337 2 6 2 + 3 □ 1 5 8 3
Expanded Column Addition Addend + addend = sum	625 + 48 = 673 Show the number in dienes and place value counters. Add the ones, then the tens, then the hundreds recording the answers as you go. Combine them all together.	Allow children to draw the steps in an organised way, still starting at the ones.  This can be in dienes or place value counters.	625 48+ 13 5 + 8 60 20 + 40 600 600 + 0 673 587 475 12 7 + 5 150 80 + 70 900 500 + 400 1062
Column Addition with regrouping. Partitioning	Make both numbers on a place value grid.  Add up the units and exchange 10 ones for one 10.  This can also be done with Base 10 to help children clearly see that 10 ones equal 1 ten and 10 tens equal 100.	Children can draw a pictorial representation of the columns and place value counters to further support their learning and understanding. 	1 1 587 475 + 1062 As the children move on, introduce decimals with the same number of decimal places and different decimal places. Money can also be used here. 7 + 5 = 12 80 + 70 = 150 500 + 400 = 900 1000 + 60 + 2 = 1062

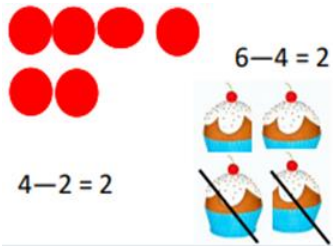
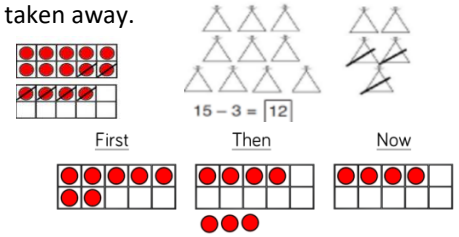
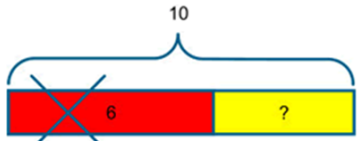
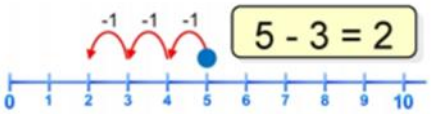
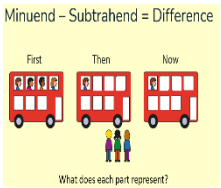
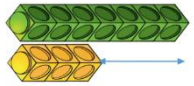
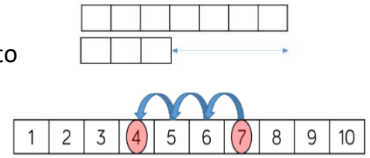
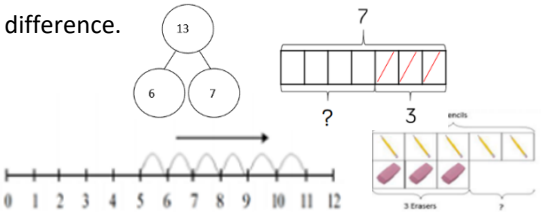
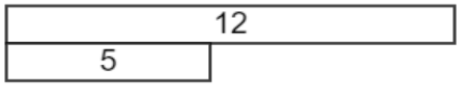
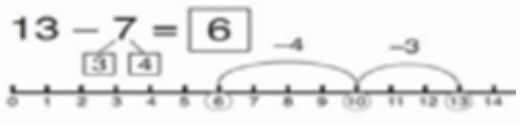
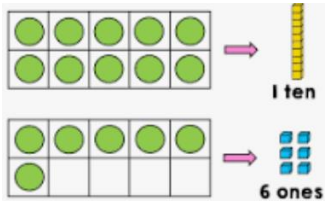
Calculation Policy: Y4, Y5 and Y6 Addition

Strategies	Concrete	Pictorial	Abstract
Y4—add numbers with up to 4 digits Addend + addend = sum	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. 1,378 + 2,148 = 3,526 	Draw representations using a place value grid or part whole model.  *'The class has raised £100 to spend on a party. They spend £25.49 on pizzas, £13.85 on drinks and £18.75 on decorations. How much do they have left to spend on the entertainment?'* 	Continue work above. Expand to decimals including within measure including money.   *'I want to buy a book that costs £5.60 and a game that costs £27.05. How much will I spend altogether?'*  IMPORTANT: Children must understand how to insert zeros as place holders when dealing with decimal numbers.
Y5—add numbers with more than 4 digits. Add decimals with 2 decimal places, including money.	As Year 4 Continue using decimal place value counters and model exchange for addition. 3.65 + 2.41 = 6.06 		As Year 4. 
Y6—add several numbers of increasing complexity Including adding money, measure and decimals with different numbers of decimal points.	As Year 5 104,328 + 61,731 = 166,059 		 Insert zeros for place holders. 

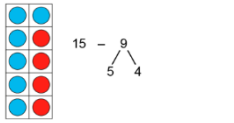
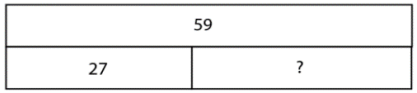
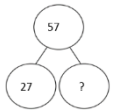
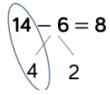
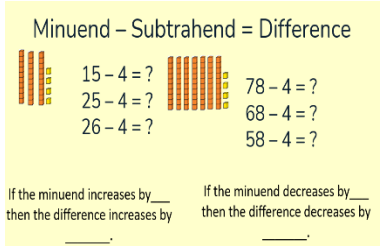
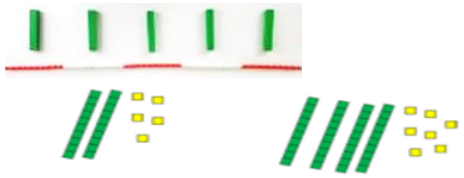
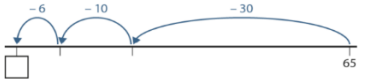
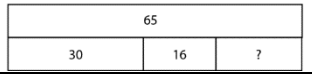
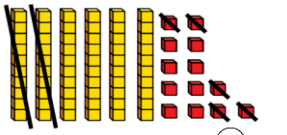
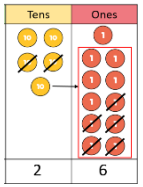
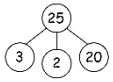
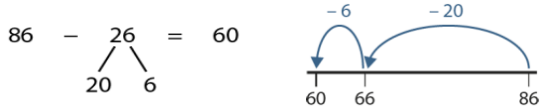
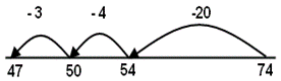
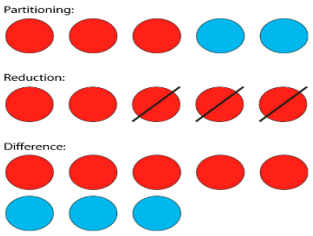
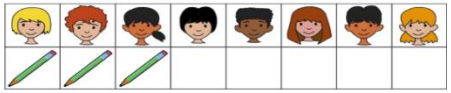
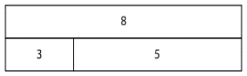
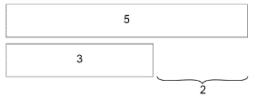
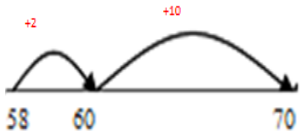
Calculation Policy: Reception Subtraction

Strategies	Concrete		Pictorial	Abstract
Finds one fewer than a group of up to five and then up to ten objects and then is able to say one fewer than a given number to 20.	Number tracts - the objects can be placed in the number tract to compare difference. 		Use a full range of different objects and models and representations to count and remove objects from; to find how many are left or to compare how many more if you have two groups. Use natural objects, seeds, sticks, pine cones, straws, counters, dice, lego bricks, people, small animals etc.	There is no requirement for children to make written recordings of their work but children can be encouraged to make their own jottings or drawings to explain what they are doing / have done. Model
Using quantities and objects they can remove a set of objects and say how many are left. Using objects, they can subtract two single-digit numbers and can count back to find the answer.	Ten frames to calculate the difference. How many have I taken away. How many are left from 10?  		Songs and rhymes that take one away each time. (Five little ducks, five speckled frogs, five current buns...)	ways to record using standard notation when appropriate.
Children verbalise the calculations they are doing. Children start to use the vocabulary of subtraction	Songs and rhymes that take on one away each time.(Five little ducks, five speckled frogs, five current buns, ...) Outdoor resources Bead strings for counting on an back and comparing difference  			

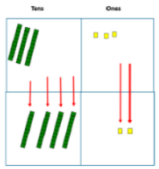
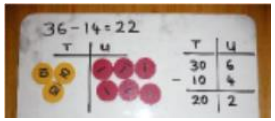
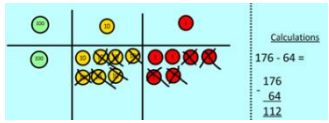
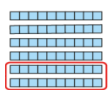
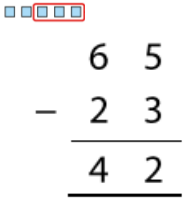
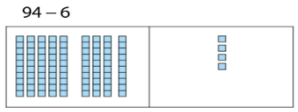
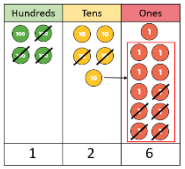
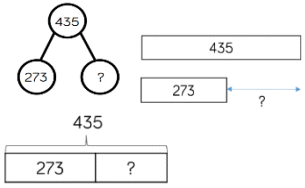
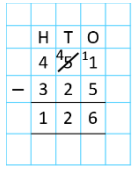
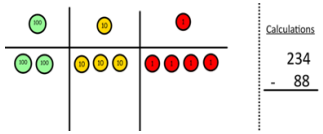
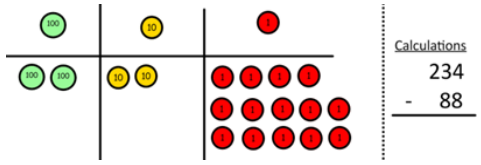
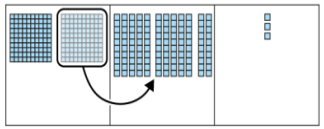
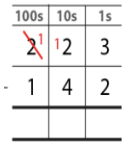
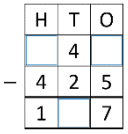
Calculation Policy: Y1 Subtraction

Strategies	Concrete	Pictorial	Abstract
Taking away ones Reduction structure (First…Then…. Now) minuend - subtrahend = difference	Use physical objects, counters , cubes etc to show how objects can be taken away. 	Cross out drawn objects to show what has been taken away. 	7—4 = 3 16—9 = 7 
Counting back	Move objects away from the group, counting backwards.  Move the beads along the bead string as you count backwards. 	Count back in ones using a number line. 	Put 13 in your head, count back 4. What number are you at? 13 – 4 = 
Find the Difference 	Compare objects and amounts .  Lay out objects to represent bar models. 	Use part, part whole models. Count on using a number line to find the difference. 	Hannah has 12 sweets and her sister has 5. How many more does Hannah have than her sister? 5 + ___ = 12 12 – 5 = ___ 
Make 10	14—9 Make 14 on the ten frame. Take 4 away to make ten, then take one more away so that you have taken 5. 	13—7 Jump back 3 first, then another 4. Use ten as the stopping point. 	16—8 = How many do we take off first to get to 10? How many left to take off? Reinforce with concrete and pictorial representations. 

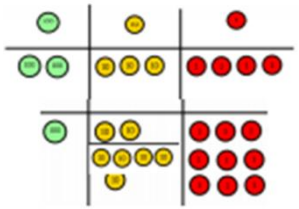
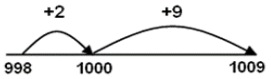
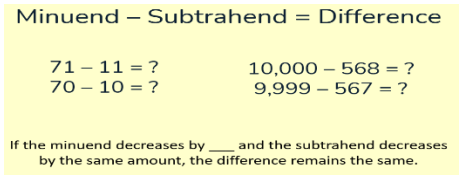
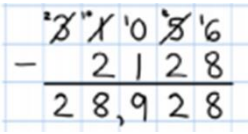
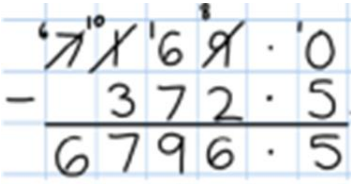
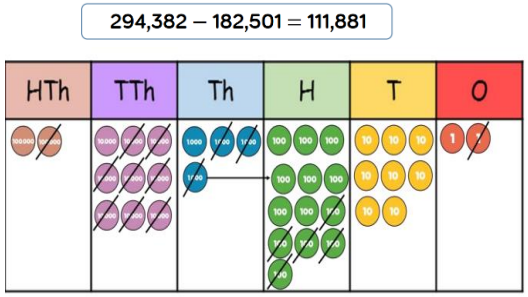
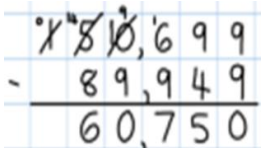
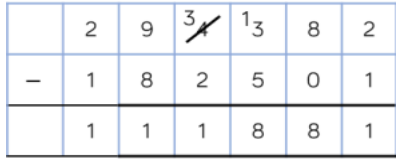
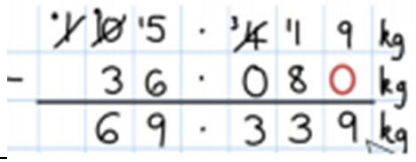
Calculation Policy: Y2 Subtraction

Strategies	Concrete	Pictorial	Abstract
Partitioning to subtract without regrouping minuend - subtrahend = difference	34—13 = 21  Use Dienes or counters to show how to partition the number when subtracting without regrouping.  Partitioning the minuend	Children draw representations of Dienes and cross off. *There are 59 children at a party 27 have taken their party bags. How many have not taken their party bags?* Part–part–whole diagram:  	43—21 = 22 56—23 = 33 56—27 = 29 59 – 27 = ?  
Subtract tens or ones from a 2D number	Model using dienes , place value counters and numicon 	Using an **empty** number line to count back in ones. Drawings of dienes can be adding within the jumps. Using an empty number line to count back ten… then multiples of 10.  	43—5 = 38 75—30 = 45 *'Paul had sixty-five stickers. He gave thirty stickers to Andrew and sixteen stickers to Alicia. How many stickers does Paul have left?'* 65 – 30 – 16 = 19
Subtract any 2D number from a 2D number (including crossing the barrier of ten)	Model using dienes , place value counters and numicon 51 – 25 = 26   73 – 25 = 48 	Partition numbers to subtract tens then units:  Partition units, looking for jumps to tens barriers: 74 – 27 = 4 7  Partitioning numbers in different ways.	38—29 = 9 85—47 = 38 Children are introduced to this in term 3 (CLIC) in preparation for formal written methods with larger numbers and also for support and reinforcing of place value. 96 - 42
Subtraction as difference  Using ten	*'There are eight children and only three pencils. How many more pencils does the teacher need so each child has one pencil?'*  Use dienes a bead bar or bead strings to model counting to the next ten and the rest.	  Where there is a SMALL difference between the 2 numbers, count on to find the difference: **70 – 58 = 12** Or Subtract 9 by subtracting 10 and adjusting: **45 – 9 = 36 45 – 10 + 1 - = 36** 	58 + 2 + 10 = 70

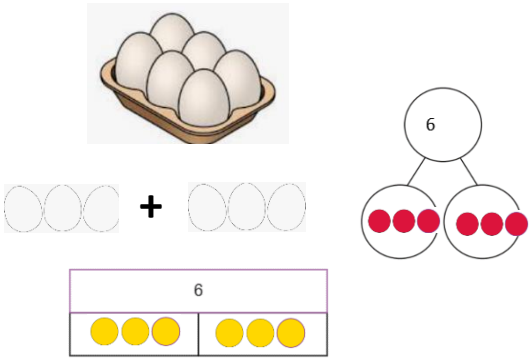
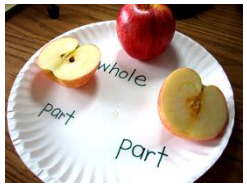
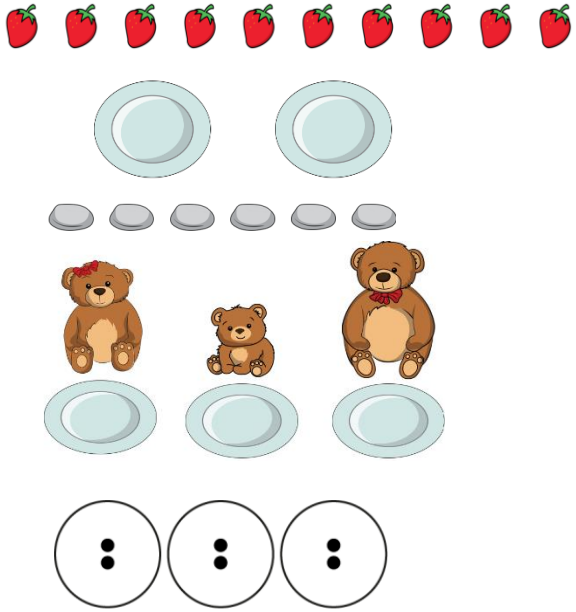
Calculation Policy: Y3 Subtraction

Strategies	Concrete	Pictorial	Abstract
Column subtraction– no regrouping minuend - subtrahend = difference	Use Base 10 to make the bigger number then take the smaller number away. Show how you partition numbers to subtract. Again make the larger number first.  	Draw the Base 10 or place value counters alongside the written calculation to help to show working.  	Clear modelling and representation will lead to clear written column subtraction. **65 – 23 = 42** 60 + 5 6 tens + 5 ones – 20 + 3 2 tens + 3 ones 40 + 2  
Expanded Column Subtraction	Use base 10 or Numicon to model partitioning (expanding) the numbers before subtracting them. *Always start with units/ones - exchanging only for the units, then tens, then both**extend to thousands etc.* 	Children may draw base ten or place value counters (partitioned) and cross of. 451 – 325 = 126  	Children can start their formal written method by partitioning the number into clear place value columns. Moving forward the children use a more compact method. 286 - 123 = 163 200 80 6 100 20 3 - 100 60 3 600 140 14 700 50 4 80 6 600 60 8 
Column Subtraction with regrouping.	Use Base 10 to start with before moving on to place value counters. Start with one exchange before moving onto subtractions with 2 exchanges. Make the larger number with the place value counters.  Start with the ones, can I take away 8 from 4 easily? I need to exchange one of my tens for ten ones. 	Draw the counters onto a place value grid and show what you have taken away by crossing the counters out as well as clearly showing the exchanges you make. When confident, children can find their own way to record the exchange/regrouping. 	*Which calculations require exchange?* 5 6 3 – 2 1 3 4 8 2 – 1 9 7 8 2 4 – 3 1 9 9 0 3 – 1 2 4 Introduce abstract representations alongside dienes or place value counters.   What are the missing digits? 

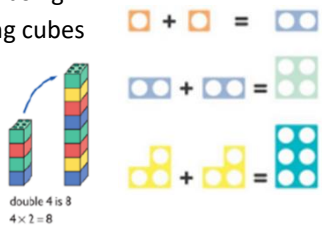
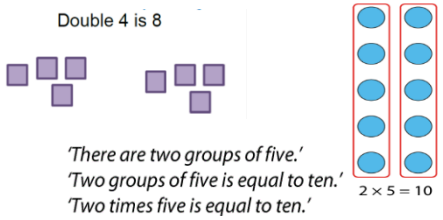
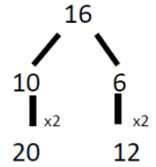
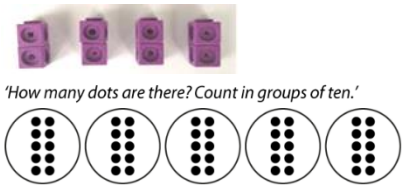
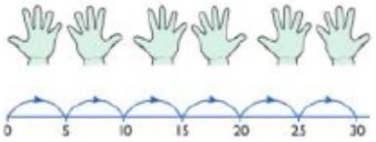
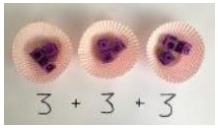
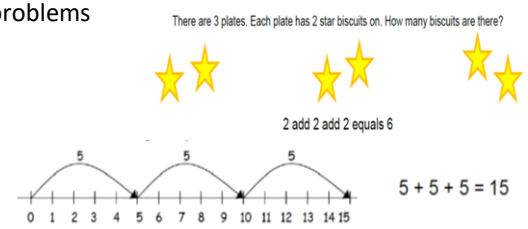
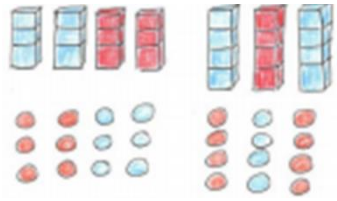
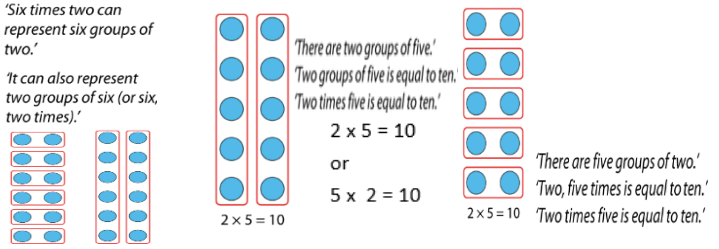
Calculation Policy: Y4, Y5 and Y6 Subtraction

Strategies	Concrete	Pictorial	Abstract
Y4—subtract numbers with up to 4 digits *Introduce decimal subtraction through context of money* minuend - subtrahend = difference	234 - 179  Model process of exchange using Numicon, base ten and then move to PV counters.	Children to draw place value counters and show their exchange—see Y3	IMPORTANT: Do not use columns to subtract from a number with **lots of zeros** or when numbers are **close** together…teach the children to let the numbers determine the best method: **1009 – 998 = 11**  
Year 5- Subtract with at least 4 digits, including money and measures. *Subtract with decimal values, including mixtures of integers and decimals and aligning the decimal*	As Year 4	Children to draw place value counters and show their exchange—see Y3	Use zeros for placeholders.  
Year 6—Subtract with increasingly large and more complex numbers and decimal values.			  

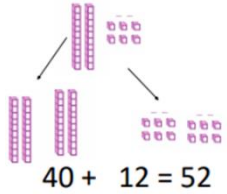
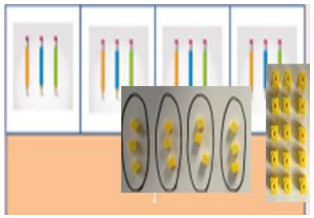
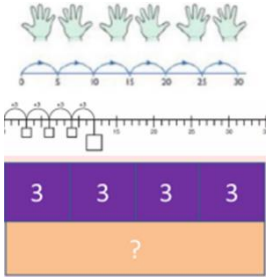
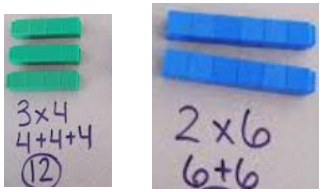
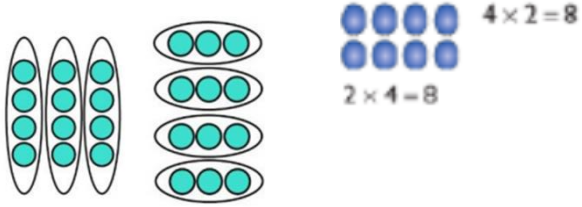
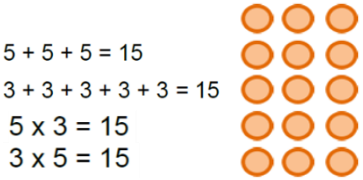
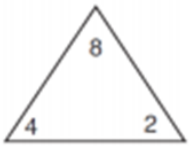
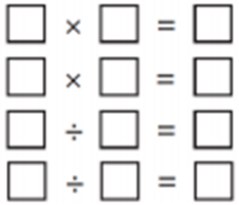
Calculation Policy: Reception Multiplication and division

Strategies	Concrete	Pictorial	Abstract
Multiplication	Double and halve numbers up to 10 Put objects into pairs and count up in twos Children start to use the vocabulary of doubling. Children verbalise the calculations they are doing.  Bring in things that come in pairs. 'How many shoes are on this table?' Counting in twos - 2p coins	Children understand that two rows of three eggs in the box make six eggs altogether. 	There is no requirement for children to make written recordings of their work but children can be encouraged to make their own jottings or drawings to explain what they are doing / have done.
Division	Share out objects between two people, count the objects and say how many each person will get. Children verbalise the calculations they are doing. Children extend their thinking to 'suppose there were three people to share the bricks between instead of two. . .' Children start to explore halving as a sharing model. Real life objects, counters, apples etc.  Discuss fairness (is it okay for child A to have 3 and child B to have 5? Why? What could we do?)		There is no requirement for children to make written recordings of their work but children can be encouraged to make their own jottings or drawings to explain what they are doing / have done. Model ways to record using exploratory mark making when appropriate. Discuss remainders as and when they occur.

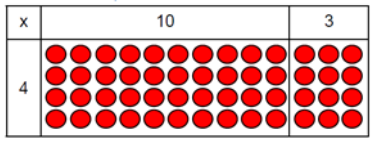
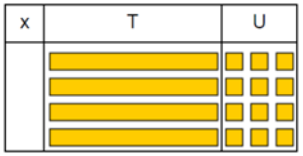
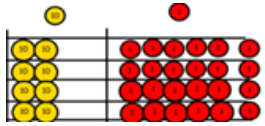
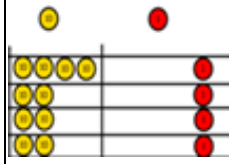
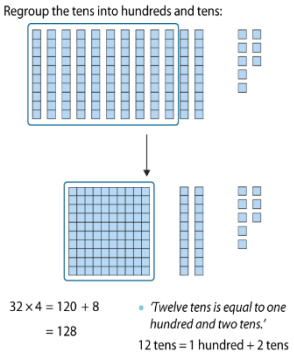
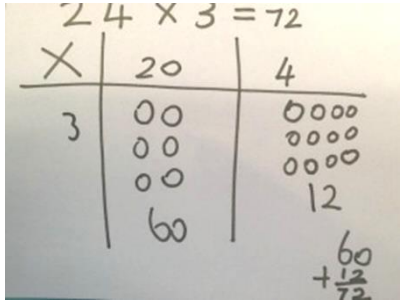
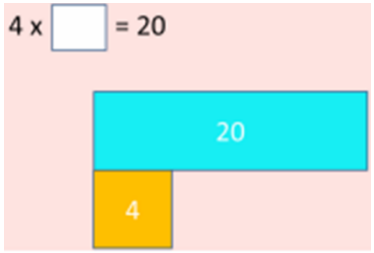
Calculation Policy: Y1 Multiplication

Strategies	Concrete	Pictorial	Abstract
Doubling	Use practical activities using manipulatives including cubes and numicon to demonstrate doubling. 	Draw pictures to show how to double a number. 	Partition a number and then double each part before recombining it back together. 
Counting in multiples	Count in multiples supported by concrete objects in equal groups 	Use a number line or pictures to continue support in 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 10, 20, 30 40, 50, 60
Repeated Addition	Use different objects to add equal groups.   	Use pictorial including number lines to solve problems 	Write addition sentences to describe objects and pictures 
Understanding Arrays—with teacher support factor x factor = product	Create arrays using counters/ cubes to show multiplication sentences. 	Draw representations of arrays to show understanding. 	**6 x 2 = 12** How many groups of five? How many groups of two? 

Calculation Policy: Y2 Multiplication

Strategies	Concrete	Pictorial	Abstract
Doubling	Model doubling using dienes and place value counters.  	Draw pictures and representations to show how to double numbers	Partition a number and then double each part before recombining it back together.
Counting in multiples of 2, 3, 4, 5, 10 from 0 (repeated addition)	Count the groups as children are skip counting, children may use their fingers as they are skip counting.  Use bar models, counters Numicon and counting sticks.  	Number lines, and part whole models (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, including missing number sequences. 0, 2, 4, 6, 8, 10 0, 3, 6, 9, 12, 15 0, 5, __, 15, __, __ , 30
Multiplication is commutative factor x factor = product	Create arrays using counters/ cubes to show multiplication sentences.  	Draw arrays in different rotations to find **commutative** multiplication sentences.  	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
Using the Inverse This should be taught alongside division, so pupils learn how they work alongside each other.	Same as above.	 	2 x 4 = 8 4 x 2 = 8 8 ÷ 2 = 4 8 ÷ 4 = 2 Show all 8 related fact family sentences.

Calculation Policy: Y3 Multiplication

Strategies	Concrete	Pictorial	Abstract
Grid Method **IMPORTANT:** In order to move on to the next stage, children MUST be able to… 1)multiply any number by 10 2)multiply any number by 100 3)multiply 1 digit by a multiple of 10 (5 x 30) and multiple of 100 (4 x 600) 4)Multiply multiples of 10 (20 x 50) factor x factor = product	Show the links with arrays to first introduce the grid method.  4 rows of 10 4 rows of 3 Move on to using Base 10 to move towards a more compact method  .4 rows of 13 Move on to place value counters to show how we are finding groups of a number. We are multiplying by 4 so we need 4 rows. Fill each row with 26.  4 x 26 = ? Add up each column, starting with the ones making any exchanges needed.   Regroup the tens into hundreds and tens: $32 \times 4 = 120 + 8$ $= 128$ 'Twelve tens is equal to one hundred and two tens.' 12 tens = 1 hundred + 2 tens	Children can represent the work they have done with place value counters in a way that they understand. They can draw the counters, using colours to show different amounts or just use circles in the different columns to show their thinking as shown below.  Bar models are used to explore missing numbers  	Start with multiplying by one digit numbers and showing the clear addition alongside the grid. | ×	30	5
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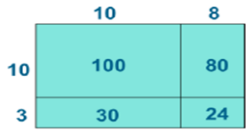
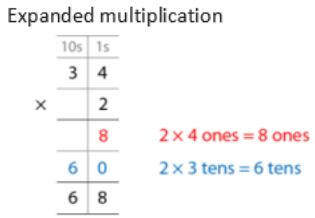
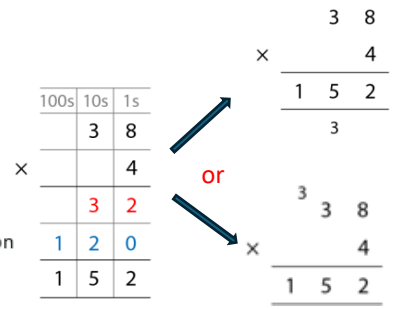
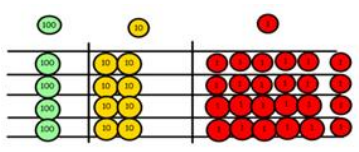
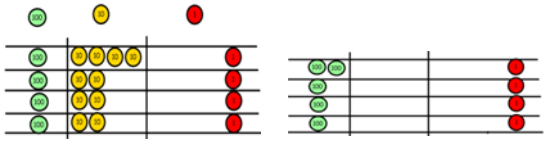
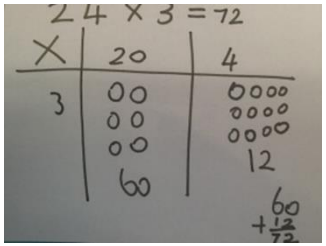
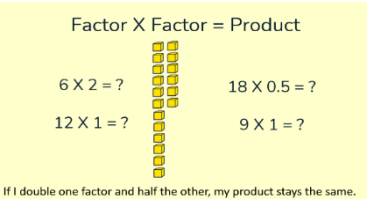
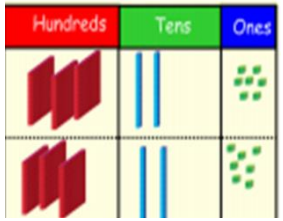
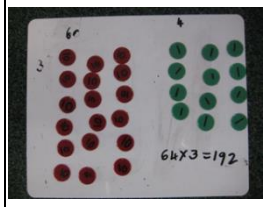
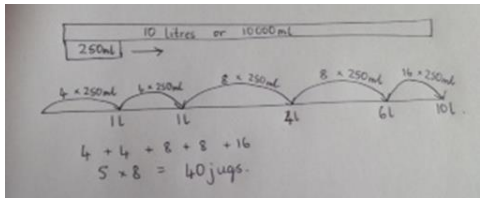
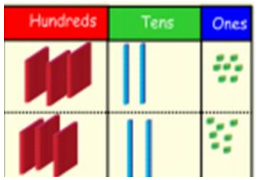
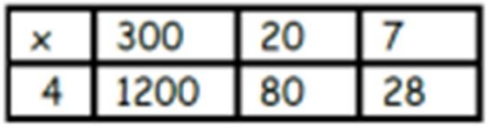
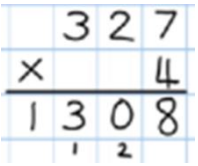
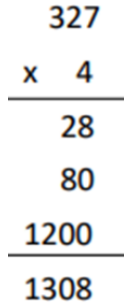
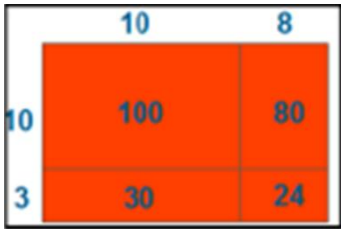
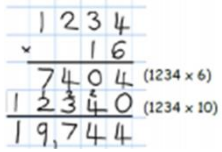
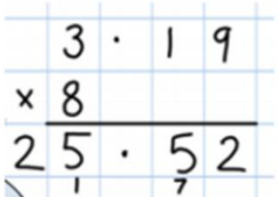
7	210	35	 210 + 35 = 245 Moving forward, multiply by a 2 digit number showing the different rows within the grid method.  'One pack of biscuits costs 84 p. How much do six packs cost?'  84 × 6 = 504 80 4 $80 \times 6 = 480$ $4 \times 6 = 24$ $480 + 24 = 504$ 'Six packs of biscuits cost 504 p.' or $84 \times 6 = 80 \times 6 + 4 \times 6$ $= 480 + 24$ $= 504$ 'Six packs of biscuits cost 504 p.' Expanded multiplication  Column method 2d x 1d  Expanded multiplication

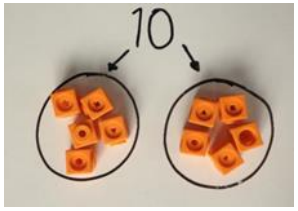
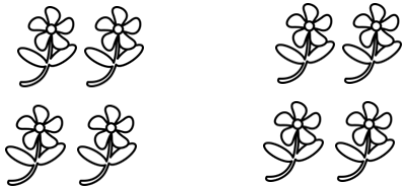
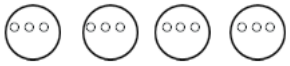
Calculation Policy: Y4 Multiplication

Strategies	Concrete	Pictorial	Abstract
Grid method recap from year 3 for 2 digits x 1 digit Move to multiplying 3 digit numbers by 1 digit. (year 4 expectation) factor x factor = product	Use place value counters to show how we are finding groups of a number. We are multiplying by 4 so we need 4 rows  Calculations 4 x 126 Fill each row with 126 Add up each column, starting with the ones making any exchanges needed. 	Same as Year 3: Children can represent their work with place value counters in a way that they understand. They can draw the counters using colours to show different amounts or just use the circles in the different columns to show their thinking as shown below. 	Start with multiplying by one digit numbers and showing the clear addition alongside the grid. | × | 30 | 5 | | --- | --- | --- | | 7 | 210 | 35 | 210 + 35 = 245 laying the foundations for 3-digit numbers. 
Column multiplication	Children can continue to be supported by place value counters at the stage of multiplication. This is initially done where there is no regrouping. 327 x 2 = 654 It is important at this stage that they always multiply the ones first.  	Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods. 	Start with long multiplication, reminding the children about lining up their numbers clearly in columns. If it helps, children can write out what they are solving next to their answer. Fill in the missing digits. This moves to the more compact method. 327 × 4 28 80 1200 1308 3 8 × 4 = 1 5 2 (3) 3 2 7 × 4 = 1 3 0 8 (1 2) 3 3 8 × 4 = 1 5 2 Fill in the missing digits 7 □ × 6 = □ □ 4

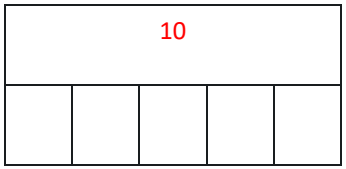
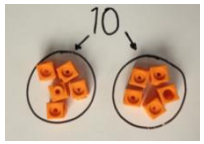
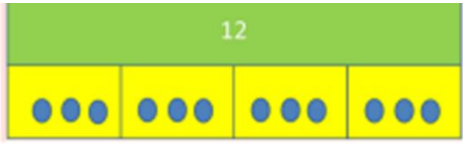
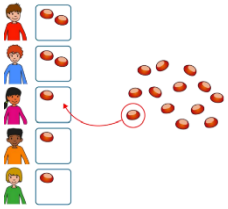
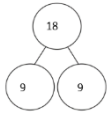
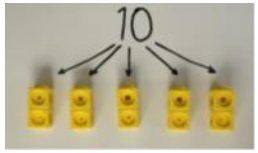
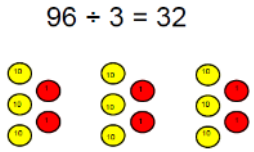
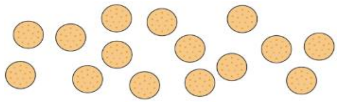
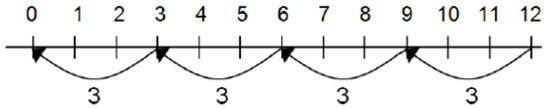
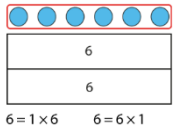
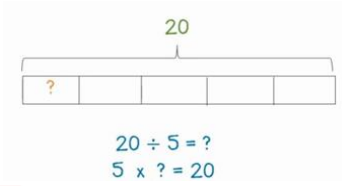
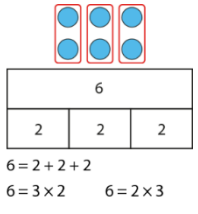
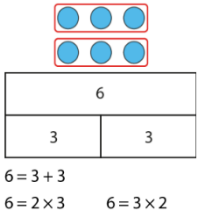
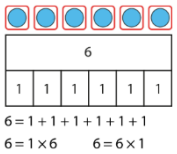
Calculation Policy: Y5 and Y6 Multiplication

Strategies	Concrete	Pictorial	Abstract
Column Multiplication for 3 and 4 digits x 1 digit factor x factor = product	Children can continue to be supported by place value counters at this stage of multiplication. This is initially done where there is no regrouping. 327 x 2 = 654 It is important at this stage that they always multiply the ones first. 		Same as above: This moves to the more compact method.  
Column multiplication for 3 and 4 digits x 2 digits.	Manipulatives may still be used with the corresponding long multiplication modelled alongside.	 Continue to use bar modelling to support problem solving	18 x 3 on the first row  (8 x 3 =24, carrying the 2 for 20, then 1 x 3) 18 x 10 on the 2nd row. Show multiplying by 10 by putting zero in units first 
Multiplying decimals up to 2 decimal places by a single digit			Remind children that the single digit belongs in the units column. Line up the decimal points in the question and the answer. 

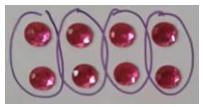
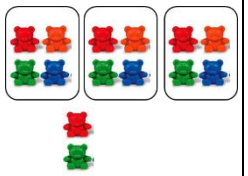
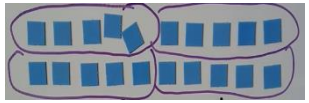
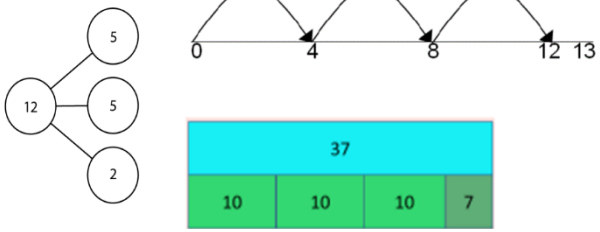
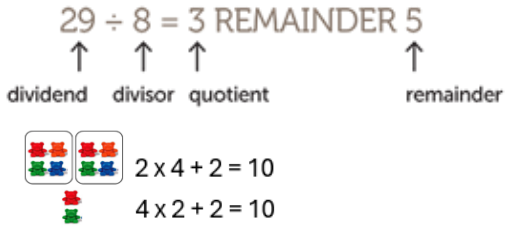
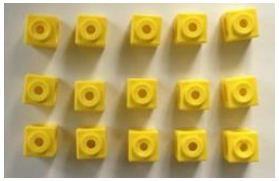
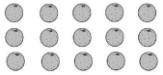
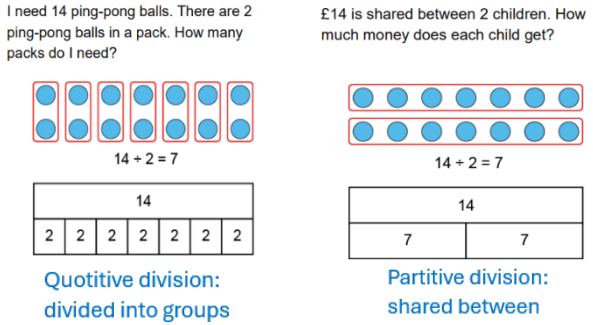
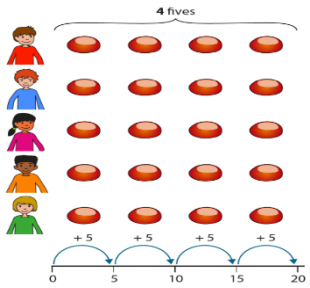
Calculation Policy: Y1 Division

Strategies	Concrete	Pictorial	Abstract
Division as sharing	I have 10 cubes, can you share them equally into 2 groups?    Could also go in bar model. 10	Children use pictures or shapes to share quantities.  8 ÷ 2 = 4 Again, could be drawn in a bar model. 8 Sharing 12 sweets between 4…How many do they each have? 	Share 12 ribbons between three people. 12 ÷ 3 = 4
With teacher support Understand division as GROUPING and link to times tables:	See multiplication for grouping.  Making groups of 5	See multiplication for grouping.	**"12 split into GROUPS OF…"** 12 ÷ **3** = 4 (use 3 times table) 12 ÷ **2** = 6 (use 2 times table) 12 ÷ **4** = 3 (use 4 times table)

Calculation Policy: Y2 Division

Strategies	Concrete	Pictorial	Abstract
Division as sharing (partitive) dividend ÷ divisor = quotient	I have 10 cubes. Can you share them equally into 5 groups?  Use a range of manipulatives (including contextualise objects) to show sharing. These could also go in a part/ part/whole model. 	Children use bar modelling to show and support understanding.  They could also draw an array objects and people or part whole models.   	12 ÷ 3 = 4 15 ÷ 5 =
Division as grouping (quotative)	Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding.      *'There are fifteen biscuits. If I put them into bags of five, how many bags will I need?'*	Use number lines for grouping. Dienes could be draw in the jumps.  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.     	28 ÷ 7 = 4 Divide 28 into 7 groups. How many are in each group?

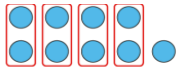
Calculation Policy: Y2 and Y3 Division

Strategies	Concrete	Pictorial	Abstract
Division as grouping (including remainders) dividend ÷ divisor = quotient	Use cubes, counters, objects or place value counters to aid understanding.   	Continue to use bar modelling to aid solving division problems. Adding remainders in too, 	How many groups of 6 in 24? 24 ÷ 6 = 4 Complete written divisions and show the remainder using r. 
Division with arrays (understanding the inverse)	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 	Draw an array and use lines to split the array into groups to make multiplication and division sentences. 	Find the inverse of multiplication and division sentences by creating four linking number sentences. 7 x 4 = 28 4 x 7 = 28 28 ÷ 7 = 4 28 ÷ 4 = 7
Use of multiplication facts (need to recognise the inverse relationship first)	Please see multiplication.	Please see multiplication.  'One five is one each. That's five.' 'Two fives is two each. That's ten.' 'Three fives is three each. That's fifteen.' 'Four fives is four each. That's twenty.' 20 ÷ 5 = 4 'Twenty divided between five is equal to four each.'	Children should be using the most appropriate methods. If they can answer it mentally, due to their multiplication facts, then encourage this.

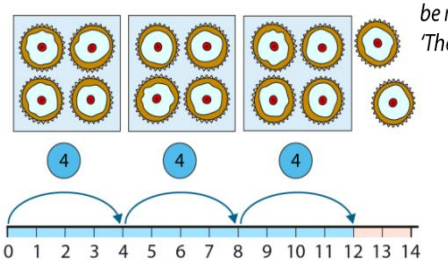
Calculation Policy: Y3 and Y4 Division

<table>
<tr><th>Strategies</th><th>Concrete</th><th>Pictorial</th><th>Abstract</th></tr>
<tr>
<td>Division with remainders

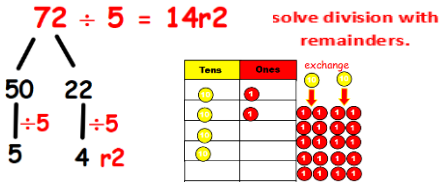
(Know when to round up or down after division)

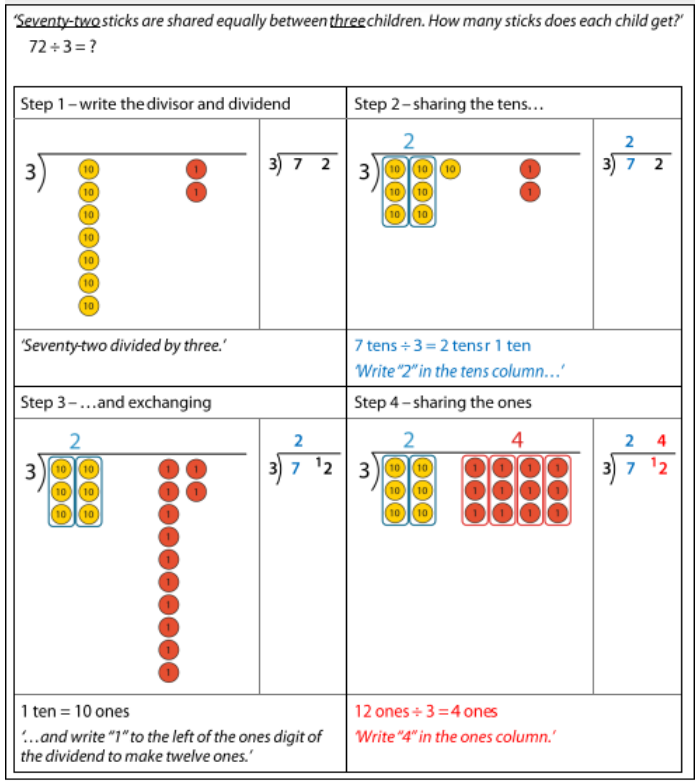
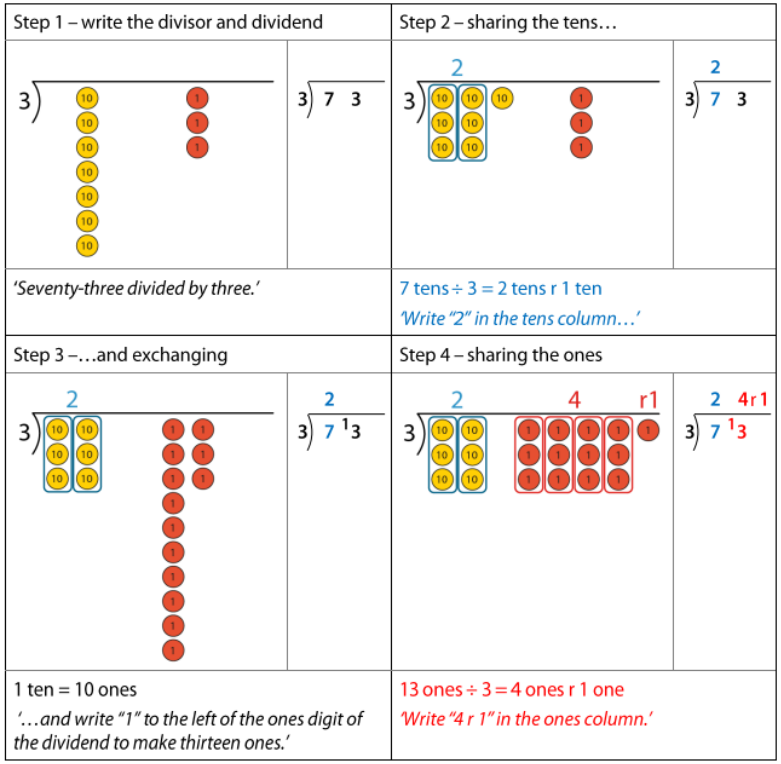
dividend ÷ divisor = quotient</td>
<td>Use counters, dienes and number lines.
 
9 = 4 × 2 + 1

'Nine is divided into groups of two. There are four groups and a remainder of one.'

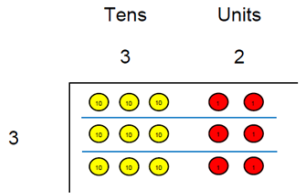
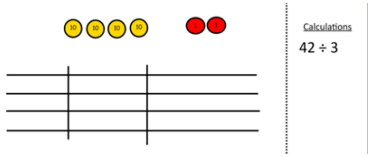
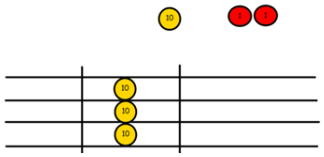
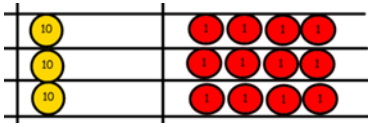
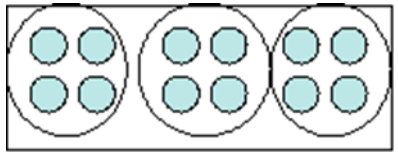
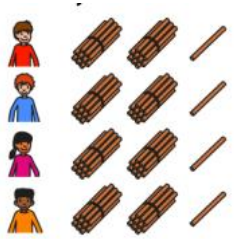
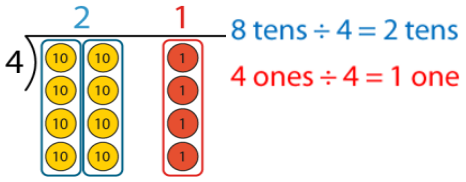
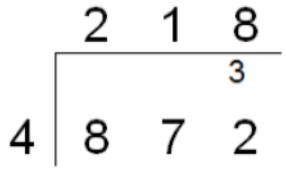
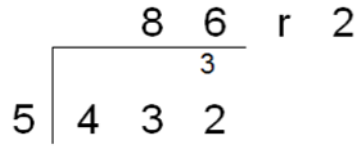
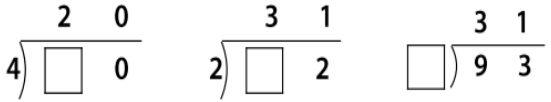
'What does the "9" represent?'
'The "9" represents the total number of counters.'
'What does the "4 × 2" represent?'
'The "4 × 2" represents the four groups of two.'
'What does the "1" represent?'
'The "1" represents the remaining one counter.'</td>
<td>Skip counting to find the solution
 

'The "14" represents the total number of cakes.'
'The "4" represents the number of cakes in each box.'
'The "3" represents the number of full boxes that can be made.'
'The "2" represents the number of cakes left over.'

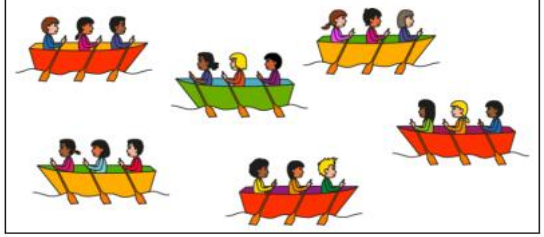
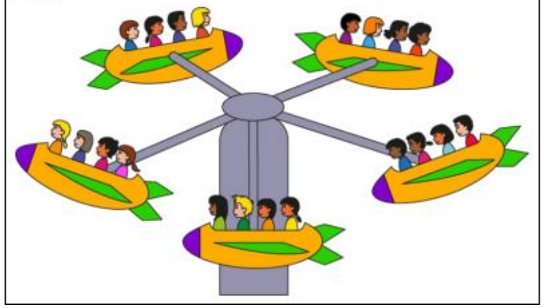
 
</td>
<td>14 = 3 × 4 + 2
14 = 4 × 3 + 2
14 ÷ 4 = 3 r 2

14 ÷ 4 = 3 r 2
dividend ÷ divisor = quotient r remainder</td>
</tr>
<tr>
<td>Short division</td>
<td colspan="2">'Seventy-two sticks are shared equally between three children. How many sticks does each child get?'
72 ÷ 3 = ?
 
</td>
<td> 
</td>
<td>Including remainders</td>
</tr>
</table>

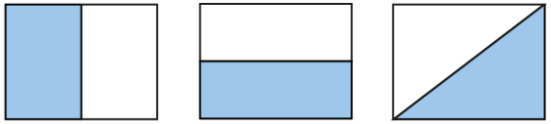
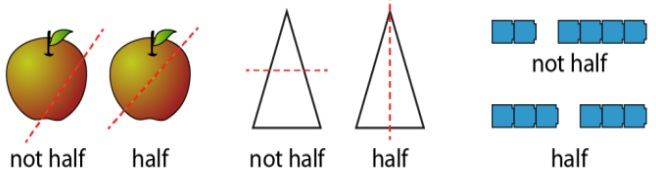
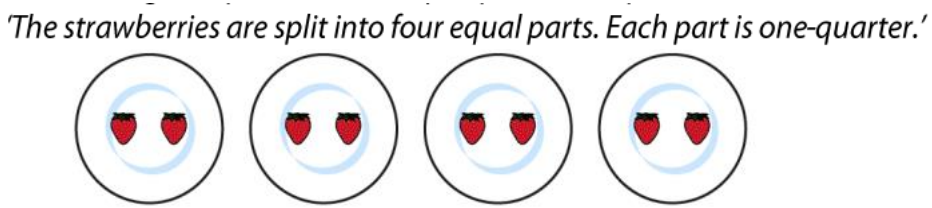
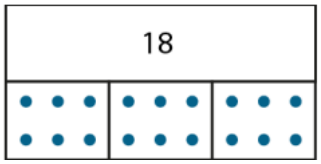
Calculation Policy: Y4 , Y5 and Y6 Division

Strategies	Concrete	Pictorial	Abstract
Short Division dividend ÷ divisor = quotient	 Use place value counters to divide using the bus stop method alongside  42 ÷ 3= Start with the biggest place value, we are sharing 40 into three groups. We can put 1 ten in each group and we have 1 ten left over.  We exchange this ten for ten ones and then share the ones equally among the groups. 	Students can continue to use drawn diagrams with dots or circles to help them divide numbers into equal groups.  Encourage them to move towards counting in multiples to divide more efficiently. *'Eighty-four sticks are shared equally between four children.*  	Begin with divisions that divide equally with no remainder.  Move onto divisions with a remainder.  *'Fill in the missing digits.'* 

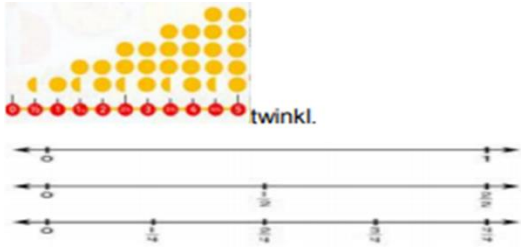
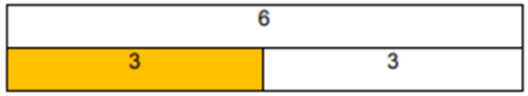
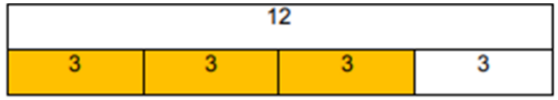
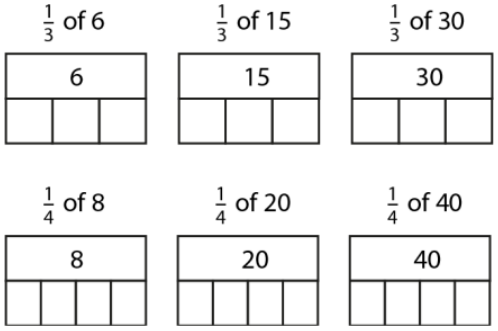
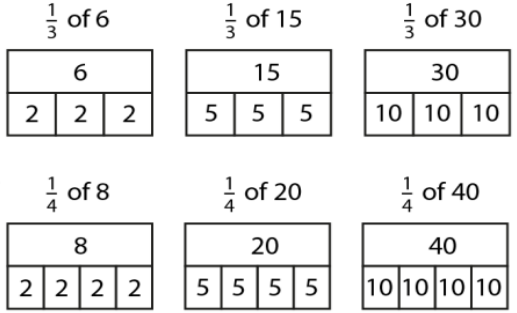
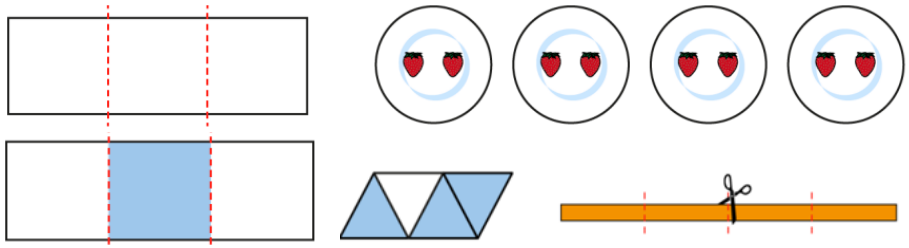
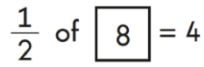
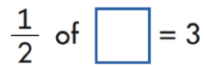
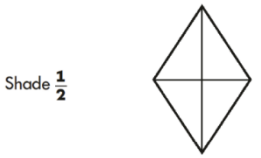
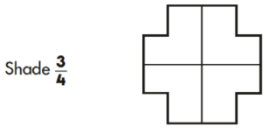
Calculation Policy: Y5 and Y6 Division

Strategies	Concrete	Pictorial	Abstract
Representing division dividend ÷ divisor = quotient *Chucking vertically* *And* *Long Division*		• *If the children on the boats swapped places with the children on the ride, what pair of expressions would describe the new situation?'* • $5 \times 3 + 5$ and $5 \times 3 + 3$ • $5 \times 3 + 3$ and $3 \times 6 + 2$ • $6 \times 3 + 2$ and $4 \times 4 + 2$ • None of these. Boats  Ride  Children to draw jottings to support them	Finally move into decimal places to divide the total accurately. **Short Division (bus stop method)** 3 5 | 5 1 1 . 0 1 4 . 6 16 21 **Chunking vertically … without ..then with remainders** 256 ÷ 7 = **36 R4** 256 - 140 (20 x 7) 116 - 70 (10 x 7) 46 - 42 (6 x 7) 4 Family of Facts: 20 x 7 = 140 10 x 7 = 70 5 x 7 = 25 2 x 5 = 10 1 x 5 = 5 **Long Division (bus stop method)** **8764 ÷4 = 2191** 2191 4 | 8764 8↓ 07 4 36 36 04 4 0 **546 ÷ 31 = 17r19** 17 r 19 31 | 546 31↓ 236 217 19 15 | 3 5 4 2 3 r 9 3 0 5 4 4 5 9 15 | 3 5 4 . 0 2 3 . 6 3 0 5 4 4 5 9 0 9 0 0

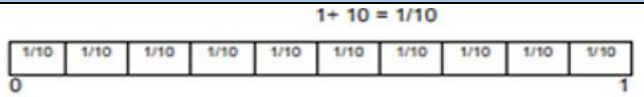
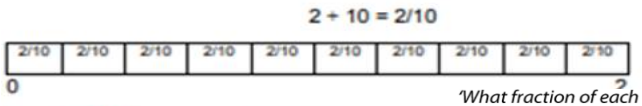
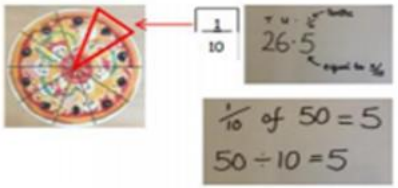
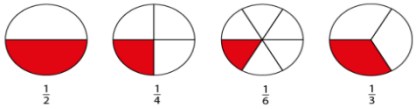
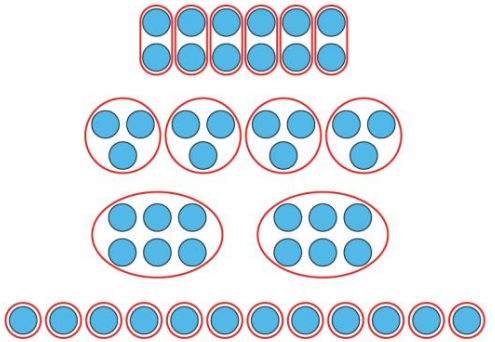
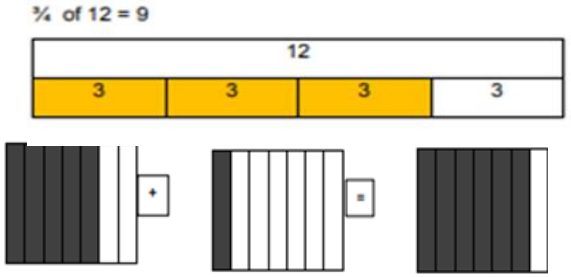
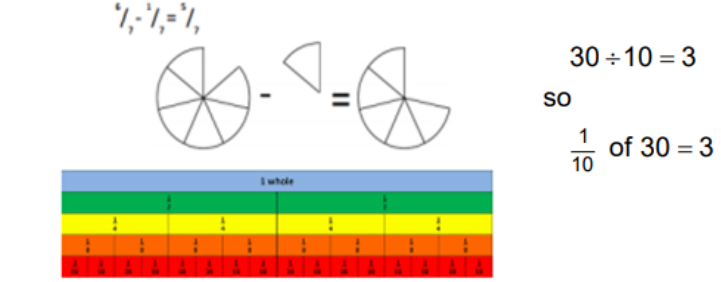
Calculation Policy: Y1 Fractions

Objectives	Models and Images
Recognise, find and name a half as one of two equal parts of an object, shape or quantity Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity Begin to learn sharing and grouping into equal parts. Begin to recognise that the larger the denominator the smaller the fraction (unit fractions or same numerator).	  Grouping/sharing  Demonstrate with a bar model    An array can be used to demonstrate sharing.

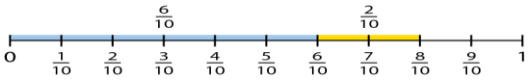
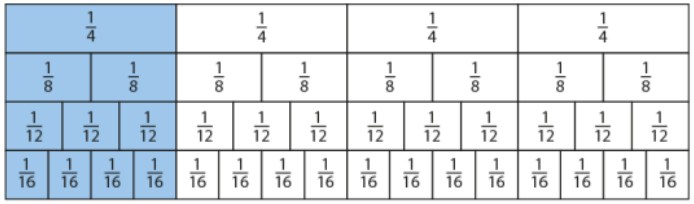
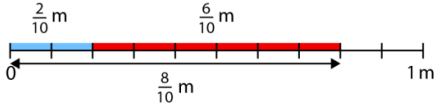
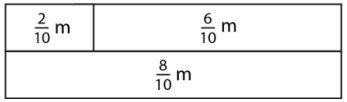
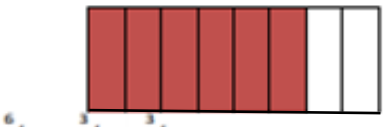
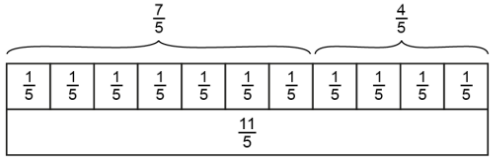
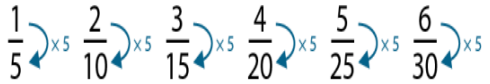
Calculation Policy: Y2 Fractions

Objectives	Models and Images
Count in fractions up to 10 starting from any number and using the ½ and 2/4 equivalence. Count fractions on a number line Recognise, find, name and write fractions 1/3 , 1/4 , 2/4 and 3/4 of a length, shape, set of objects or quantity. Write simple fractions for example, 1/2 of 6 = 3 and recognise the equivalence of 2/4 and 1/2 .	 Bar model ½ of 6 = 3  ¾ of 12 = 9   →  *'The rectangle is split into three equal parts. Each part is one-third.'* *'The strawberries are split into four equal parts. Each part is one-quarter.'*  one-third     

Calculation Policy: Y3 Fractions and Decimals

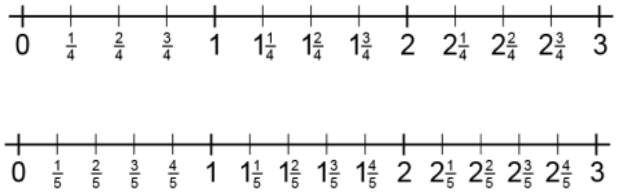
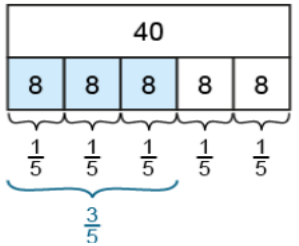
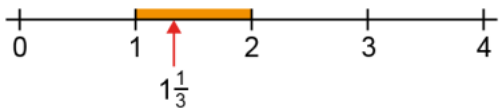
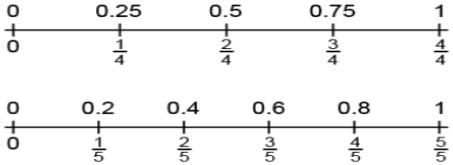
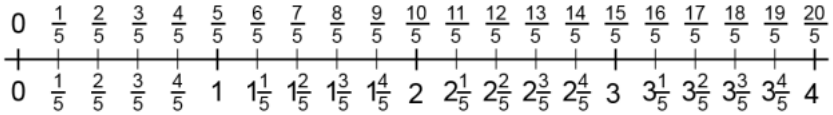
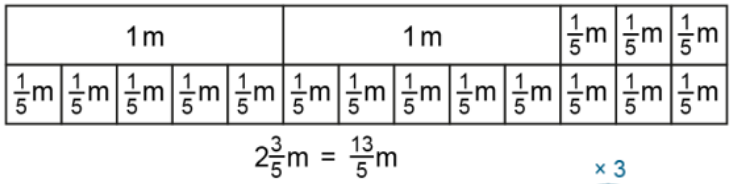
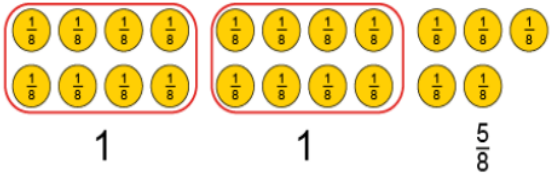
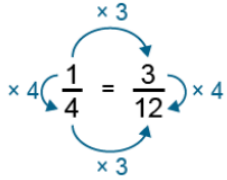
Objectives	Models and Images
Count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one digit numbers or quantities by 10 Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators Recognise and use fractions as numbers: unit fractions and non- unit fractions with small denominators Recognise and write simple mixed number fractions- link to the addition of fractions with the same denominator Compare and order unit fractions, and fractions with the same denominators	   *'What fraction of each circle is shaded?'*  Ordering the fractions: $\frac{1}{6} < \frac{1}{4} < \frac{1}{3} < \frac{1}{2}$ Dividing 12 counters into equal groups:    $30 \div 10 = 3$ so $\frac{1}{10}$ of $30 = 3$ Finding the wholes – different size part, same fraction: • *'What is the same?'* • *'What is different?'*  This is $\frac{1}{5}$ of Class C.  This is $\frac{1}{5}$ of Class D • *'Which class has more students?'* • Class C: *'If one-fifth is a part, then the whole is five times as much. Take five parts and put them together to make one whole. The part has six students. So, there are $5 \times 6 = 30$ students.'*

Calculation Policy: Y4 Fractions and Decimals

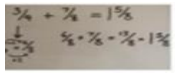
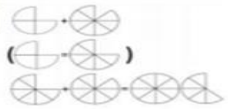
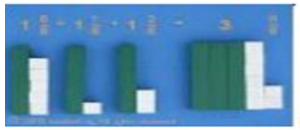
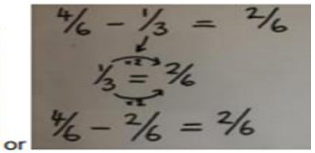
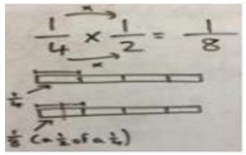
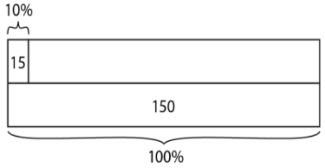
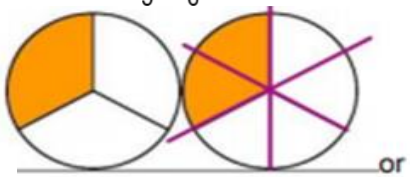
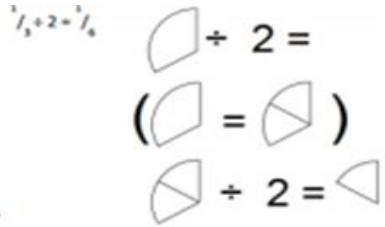
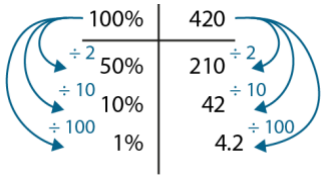
Objectives	Models and Images
Recognise and show using diagrams, families of common equivalent fractions Count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by tenths Solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number Add and subtract fractions with the same denominator · find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths Recognise and write mixed number fractions- link to the addition of fractions with the same denominator Begin to simplify some fractions	  $\frac{8}{9}-\frac{3}{9}=\frac{5}{9}$ $\frac{8}{10}-\frac{2}{10}=\frac{6}{10}$   $\frac{17}{25}-\frac{5}{25}+\frac{8}{25}=\frac{\square}{\square}$  $\frac{2}{10}$ m, $\frac{6}{10}$ m, 0, $\frac{8}{10}$ m, 1 m ¾ + ¾ = ⁶/₄   = 1 ½  ⁶/₄ - ³/₄ = ³/₄ $7\frac{2}{5}+\frac{4}{5}=8\frac{1}{5}$  ÷ 4, $\frac{4}{12}=\frac{1}{3}$, ÷ 4 Simplifying fractions  

Part	Part as a fraction of the whole	Number of equal parts in the whole	Whole
△		3	△△
▭		5	▭▭▭▭▭
🚶🚶🚶🚶		4	🚶🚶🚶🚶 🚶🚶🚶🚶
———	$\frac{1}{5}$		
👫	$\frac{1}{7}$		

Calculation Policy: Y5 Fractions and Decimals

Objectives	Models and Images
Recognise and show, using diagrams, families of common equivalent fractions Count up and down in hundredths; recognise that hundredths arise when dividing an object by a 100 and dividing tenths by 10. Solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number Add and subtract fractions with the same denominator Recognise and write decimal equivalents of any number of tenths or hundredths Recognise and write decimal equivalents to ¼; ½; ¾ Find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths Round decimals with 1 decimal place to the nearest whole number Compare numbers with the same number of decimal places up to 2 decimal places Solve simple measure and money problems involving fractions and decimals to 2 decimal places.	Use a number line to support counting up and down in multiples eg quarters and fifths   $40 \div 5 = 8$ So, $\frac{1}{5}$ of $40 = 8$ $8 \times 3 = 24$ So, $\frac{3}{5}$ of $40 = 24$ $8\frac{1}{5} - \frac{4}{5} = 8\frac{1}{5} - \frac{1}{5} - \frac{3}{5}$ $= 8 - \frac{3}{5}$ $= 7\frac{2}{5}$ Place mixed n umbers on a number line and co nvert between mixed numbers and im proper fractions.  $4\frac{2}{9} + 1\frac{3}{9} = 5\frac{5}{9}$    $2\frac{3}{5}\text{m} = \frac{13}{5}\text{m}$  $\frac{21}{8} = 2\frac{5}{8}$ Find equivalent fractions $\frac{3}{5} = \frac{6}{10}$ or $\frac{3}{12} = \frac{8}{32}$ 

Calculation Policy: Y6 Fractions, Decimals and Percentages

Objectives	Models and Images
Use common factors to simplify fractions; use common multiples to express fractions in the same denomination Compare and order fractions, including fractions Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions Multiply simple pairs of proper fractions, writing the answer in its simplest form Divide proper fractions by whole numbers Associate a fraction with division and calculate decimal fraction equivalents for a simple fraction. Identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1,000 giving answers are up to three decimal places Multiply one-digit numbers with up to 2 decimal places by whole numbers Use written division methods in cases where the answer has up to 2 decimal places Solve problems which require answers to be rounded to specified degrees of accuracy Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.	   or   $\frac{6}{15} = \frac{2}{5}$ (÷ 3, ÷ 3) Simplifying: dividing the numerator and the denominator by the common factor $\frac{4}{12} = \frac{1}{3}$ (÷ 4, ÷ 4) $\frac{4}{12} = \frac{2}{6} = \frac{1}{3}$ (÷ 2, ÷ 2, ÷ 2, ÷ 2) Simplifying: dividing the numerator and the denominator by the highest common factor *'I am thinking of a number. 10% of my number is 15. What is the number I am thinking of?'* Bar model:   $\frac{2}{5} > \frac{2}{6}$  or   12% = $\frac{12}{100} = \frac{3}{25}$ (÷ 4, ÷ 4) *'Find 45% of 64.'* **100% 64** 50% 32 10% 6.4 5% 3.2