Hateley Heath Academy
Calculation Policy

Date approved:	September 2024
Approved by:	CEA
Date adopted by the MAT (i.e. effective date):	October 2024
This policy is scheduled for review on:	Every 3 years

Contents

Policy Statement

This policy outlines Manor Multi Academy Trust's ('we' / ''our' / 'us') expectations of our employees' ('you') in relation to our Maths curriculum and provision at Hateley Heath Academy.

We are committed to equality and value diversity. As such we are committed to fulfilling our Public Sector Equality Duty (Equality Duty) obligations and expect all staff and volunteers to share this commitment.

This policy should also be applied in accordance with our Staff Code of Conduct, Dignity at Work, Safeguarding and Child Protection, Safer Recruitment, and ICT Acceptable Use policies and Procedures. Copies of all policies and procedures can be accessed via the **All MAT Staff** area on Teams.

The Equality Duty requires us to have due regard to the need to:

- Eliminate unlawful discrimination, harassment, and victimisation.
- Advance equality of opportunity.
- Foster good relations between people who share protected characteristics, such as age, gender, race and faith, and people who do not share them.

If you consider that any of our practices, policies or procedures may be indirectly discriminatory, you should report your concerns and the basis for them to your line manager, who will take appropriate action and ensure that you receive a written response in respect of the concerns that you have raised.

This policy does not form part of your contract of employment. We reserve the right to amend or withdraw this policy at any time.

Scope

This policy applies to employees and agency workers, whether during working hours or otherwise.

This Policy provides information which underpins our Staff Code of Conduct, and Disciplinary Policy and Procedures. Copies of these policies and procedures can be accessed via the **All MAT Staff** area on Teams.

Aims & Principles

The aim of this policy is to enable teachers to teach the correct strategies for calculation, with the appropriate pitch.

Curriculum Intent

Our Mathematics curriculum is designed with the intent that every child from EYFS to Year 6 will develop a love for maths and become confident and competent mathematicians. We strive for all children to develop their ability to calculate, reason and to problem solve through the use of mental and written strategies. Pupils will develop their understanding and the ability to recall and apply knowledge rapidly and accurately. This will be embedded through their time at school through varied fluency, problem solving and reasoning. Through this, children will be able to reason mathematically and solve problems by applying their mathematics systematically toa a variety of real-life problems with increasing understanding. Our curriculum prepares the children for mathematics beyond primary school and into the wider world.

Curriculum Implementation

This policy has been largely adapted from the White Rose Maths Hub Calculation Policy. It is a working document and will be revised and amended as necessary. Progression within each area of calculation is in line with the national curriculum. This policy should be used to support children and develop a deep understanding of number and calculation, teaching it through the use of **concrete, pictorial** and **abstract** representations.
It is important for children to use the correct mathematical language as part of their learning. New vocabulary will be introduced in the context and explained carefully. High expectations are essential for children to use the correct vocabulary which is in line with the 2014 National Curriculum Maths programme of study.

Three Approaches in Maths

1. **Concrete**

Concrete is the first stage of learning and the foundation for conceptual understanding. Pupils are given a problem or a skill and will use objects to act upon it.

2. **Pictorial**

Once children understand the concrete method they can then progress to pictorial. This is visual representations of concrete objects which are used to model problems.

3. **Abstract**

This is the third step in a child's learning. Abstract maths encompasses the structure of maths problems through formats and equations to deepen maths concepts used in the real world.

Objectives

Year One

- Numbers to 50 count forwards and backwards especially crossing tens boundaries.
- Partition all numbers to ten using part whole and bar model.
- Know by heart add and subtract number facts to ten.
- Know by heart doubles and halves of numbers to ten.
- Know one more and one less of numbers to 50.
- Can chant in 2s, 10s and 5s and begin to identify the patterns.
- Read and write numbers and form numerals correctly from top to bottom.
- Know the aggregation and partitioning structures of add and subtract.
- Know the augmentation and reduction structures of add and subtract.
- Know how bonds to ten relate to bonds of multiples of 10 to 100 and use this knowledge.

Year Two

- Count forwards and backwards numbers to 100 especially crossing tens boundaries.
- Partition all numbers to 15 using part-whole and bar model.
- Know addition and subtraction number facts to 20 using strategies including bridging ten doubling / halving.
- Know the difference structure of subtraction.
- Know one more and one less of numbers to 100.
- Know ten more and ten less of numbers to 100 (use of number grid / base ten / arrow cards / number line)
- Add and subtract 2-digit and one digit e.g., 26 + 6 or 32 – 5.
- Add and subtract 2-digit and 2-digit.
- Repeated addition structure of multiplication.
- Know 2, 5 and 10 x tables including patterns of their multiples.

Year Three

- Review all Year 2 objectives especially bridging ten to ensure that all can do this.
- To know by heart number bonds (known also as complements to 100 e.g., 45 + ? = 100.
- Know numbers to 1000 counting forwards and backwards (not all the way to 1000 but chunks) including crossing 100 boundaries.
- Know one, ten and a hundred more / less than any number to 1000.
- Be adept at mental calculation strategies within 1000.
- Begin to use column addition and subtraction continuing to use all structures of add and subtract e.g., augmentation, reduction, partition, aggregation, difference.
- Revise previous year group times table and know by heart 2, 4 and 8 times tables and patterns across them.
- Know by heart 3, 6 and 9 times tables and patterns across them.
- Use repeated addition structure for multiplication.
- Use grouping and sharing structure for division.
- Understand part whole relationship of fractions / identify unit and non-unit fractions / add and subtract fractions where denominator is the same.

Year Four

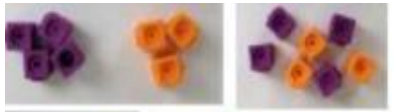
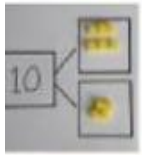
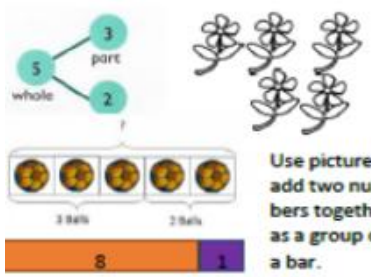
- Know numbers to 10,000 counting forwards and backwards (not all the way to 10,000 but chunks) including crossing 100 boundaries and 1000 boundaries.
- Know one, ten, a hundred and a thousand more / less than any number to 10,000.
- Be able to use column addition and subtraction with 4-digit numbers.
- Know by heart and rapidly recall all x tables to 12 x 12.
- Understand tenths and hundredths.
- Divide with remainders.
- Multiply and divide by 10 and 100.
- Do short division and short multiplication.
- Understanding multiplication and division as inverse.
- Convert between mixed numbers and improper fractions/Order and compare fractions.

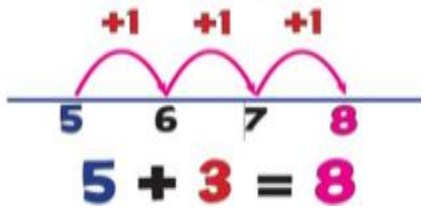
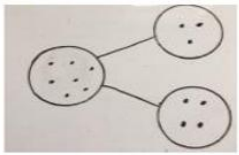
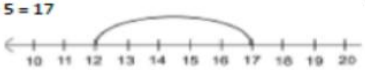
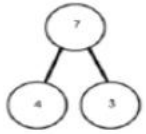
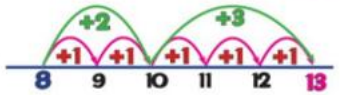
Year Five

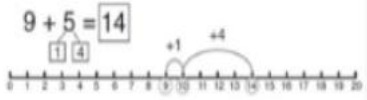
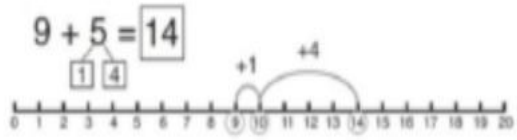
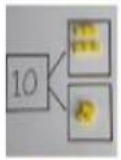
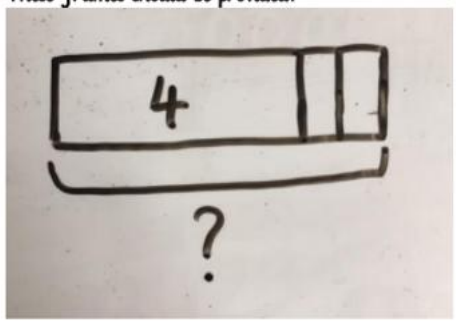
- Review times tables so all children are fluent.
- Review formal written methods for add and subtract so that all children are competent when adding and subtracting 5-digit integers and decimals (see year 4 representation and build upon this skill using representations).
- Children to understand the bar method for arithmetic structures and applying to number problems.
- To multiply and divide numbers and decimals by 10, 100 and 1000 and explain the effect.
- Read and write numbers to 1,000,000 and compare any number or group of numbers.
- Understand fractions as parts of a whole, compare and order them using a range of methods, make equivalent fractions, convert between mixed and improper fractions.
- Be able to do short division and multiplication (as with Year 4 but with 4-digit numbers).
- To know and use vocabulary; multiple, prime, factor, square, cube.
- To understand tenths, hundredths, and thousandths and work with them.

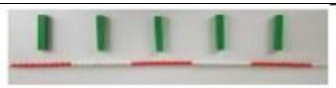
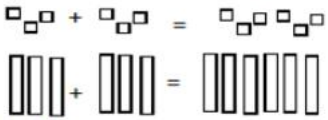
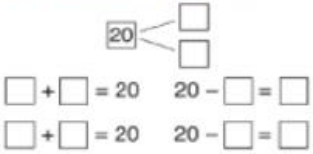
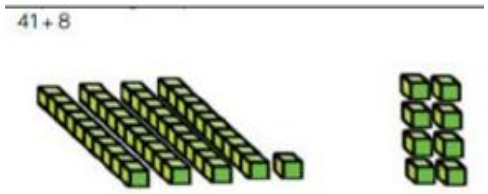
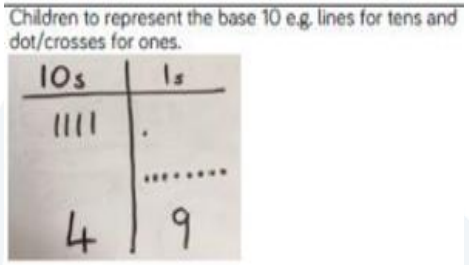
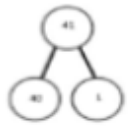
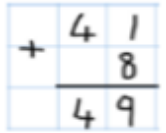
Year Six

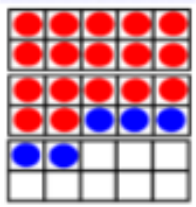
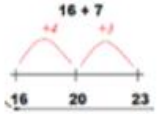
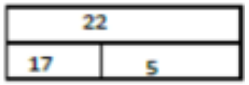
- Read and write numbers to 10,000,000 and compare any number or group of numbers.
- To be able to divide by 2-digit divisors (long division) and understand the process.
- To be able to multiply by two-digit multiplier (long multiplication).
- To begin to be able to multiply and divide proper fractions by whole numbers.
- To link fractions, decimals and percentages (this builds on work done in year 5 where percentages are introduced and the links between fractions and decimals are made).

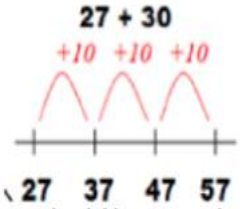
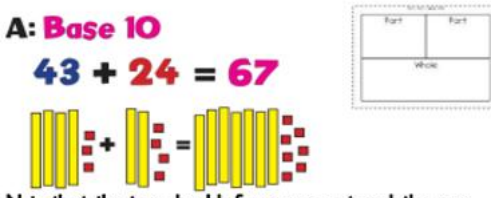
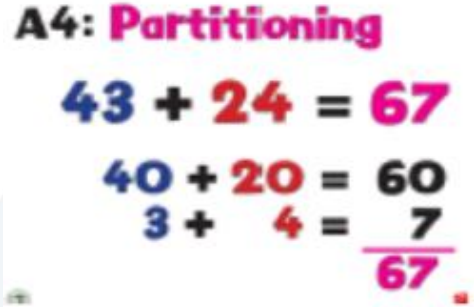
Year 1 **Addition**			
Objective	Concrete	Pictorial	Abstract
Represent and use number bonds and related subtraction facts (within 10) Combining two parts to make part-whole model.	  Use part part whole model. Use cubes to add two numbers together as a group or in a bar. 	 Use pictures to add two numbers together as a group or in a bar.	$4 + 3 = 7$  $10 = 6 + 4$ Use the part-part whole diagram as shown above to move into the abstract.

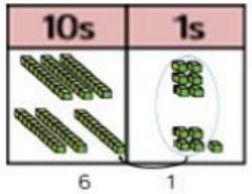
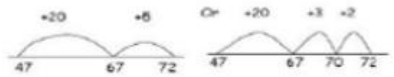
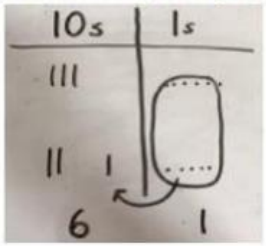
Add and subtract numbers to 10 including 0. Start at the bigger number and count on.	**A2: Counting On**  5 + 3 = 8 Photographs can be used but children should be provided with number lines to mark an example onto. 	Children to represent the cubes using dots or crosses. They could put each part on a part whole model too.  12 + 5 = 17  Start at the larger number on the number line and count on in ones or in one jump to find the answer.	4 + 3 = 7 Four is a part, 3 is a part and the whole is seven.  Part, part, wholes are provided. 5 + 12 = 17 Place the larger number in your head and count on the smaller number to find your answer. **A2a: Counting On**  8 + 5 = 13 Use a blank number line and encourage children to start at larger number

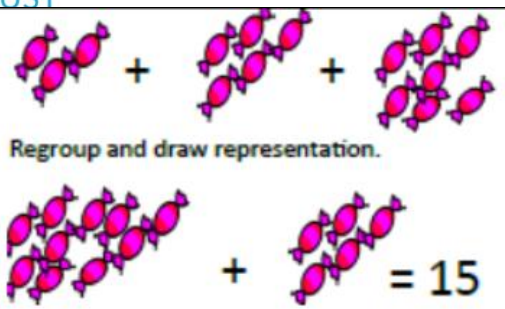
To solve one step problems that involve addition and subtraction using concrete objects, pictorial representations and missing number problems. Regrouping to make 10. Mental strategies.	 6 + 5 = 11  Start with the bigger number and use the smaller number to make 10. Use ten frames. 6 + 5  Ten frames . part, part whole to be provided.	 3 + 9 = Use pictures or a number line. Regroup or partition the smaller number using the part part whole model to make 10.  	A2a: Counting On  8 + 5 = 13 Children to develop an understanding of equality e.g. 6 + □ = 11 6 + 5 = 5 + □ 6 + 5 = □ + 4
Represent and use number bonds and related subtraction facts (within 20) Combining two parts to make a whole. Part-whole model.	  Use part part whole model. Use cubes to add two numbers together as a group or in a bar.  Use of egg boxes or ten frames may be preferable.	Use of bar modelling to represent the concrete equipment in tens frames. These frames should be provided. 	A2a: Counting On  8 + 5 = 13 Emphasis should be on the language *'1 more than 5 is equal to 6.'* *'2 more than 5 is 7.'* *'8 is 3 more than 5.'*

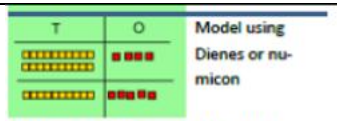
Year 2 Addition			
Objective	Concrete	Pictorial	Abstract
Add and subtract numbers using concrete, pictorial and abstract and mentally. Including a two-digit numbers and ones, a two-digit number and tens and a two-digit number adding three one-digit numbers. Adding multiples of 10 using multiple facts. Mental strategies	 Model using dienes and bead strings  2 + 3 = 5 So 20 + 30 = 50	 3 tens + 5 tens = ____ tens 30 + 50 = ____ Use representations for base ten. 	3 + 4 = 7 *leads to* 30 + 40 = 70 *leads to* 300 + 400 = 700 20 + 30 = 50 70 = 50 + 20 40 + □ = 60
Add and subtract numbers using concrete objects, pictorial representations and mentally including a two-digit number and ones; a two-digit	 41 + 8	 Children to represent the base 10 e.g. lines for tens and dot/crosses for ones. 10s | 1s IIII | ..... 4 | 9	□ + 1 = 16 16 − 1 = □ 1 + □ = 16 16 − □ = 1 41 + 8  1 + 8 = 9 40 + 9 = 49 

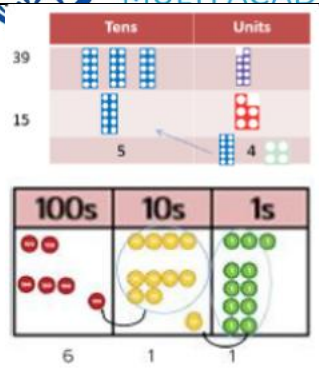
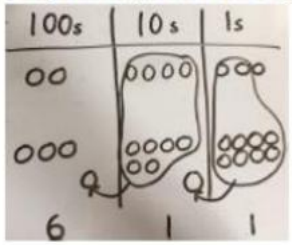
number and tens; two two-digit numbers; adding three one-digit numbers. Add a 2-digit number and ones.			
Add and subtract numbers using concrete objects, pictorial representations and mentally including a two-digit number and ones; a two-digit number and tens; two 2-digit numbers adding three one digit numbers. **Solve problems with addition and subtraction applying their increasing knowledge of mental written methods.**	 17 + 5 = 22 Use ten frame to make 'magic ten Children explore the pattern. 17 + 5 = 22 27 + 5 = 32	Use part part whole and number line to model. 17 + 5 = 22  Use the regroup to make ten method – modelled on a number line and through the part whole model	17 + 5 = 22 Explore related facts 17 + 5 = 22 5 + 17 = 22 22—17 = 5 22—5 = 17 

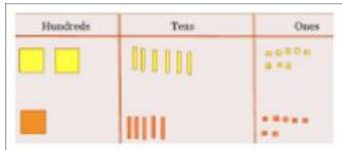
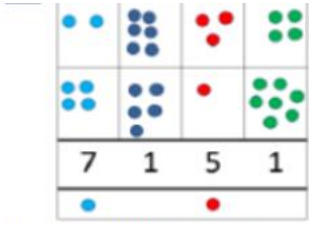
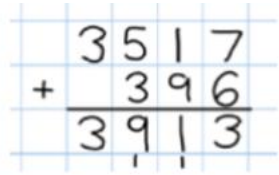
Add a 2-digit number and ones. Mental Strategy			
Add and subtract numbers using concrete objects, pictorial representations mentally, including a two-digit number and ones; a two-digit number and tens; two two-digit numbers adding three one-digit numbers. **Add a two-digit number and tens**	 25 + 10 = 35 Explore that the ones digit does not change	 27 37 47 57 Encourage the children to use their own number lines as well as mentally count on in tens.	27 + 10 = 37 27 + 20 = 47 27 + □ = 57 Vary the fluency.
Add and subtract numbers using concrete objects, pictorial representations mentally, including a two-digit number and ones; a two-digit number and tens; two two-digit numbers adding	 A: Base 10 43 + 24 = 67 Note that the tens should form one part and the ones should be partitioned into the next part to help to physically partition the number.	 A4: Partitioning 43 + 24 = 67 40 + 20 = 60 3 + 4 = 7 67	21 +34 Use of the formal written method.

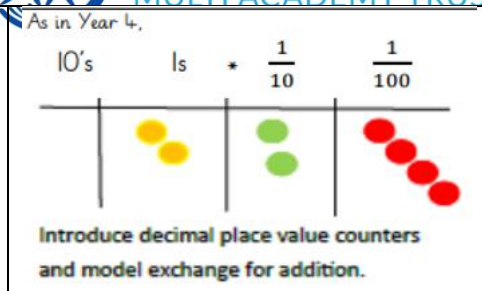
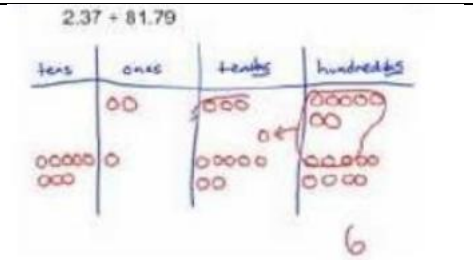
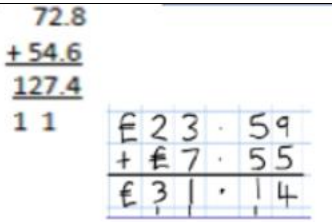
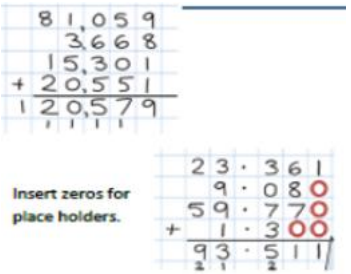
three one-digit numbers. **Add two 2-digit number using partitioning**			
Add and subtract numbers using concrete objects, pictorial representations mentally, including a two-digit number and ones; a two-digit number and tens; two two-digit numbers adding three one-digit numbers. **Add two 2-digit number which bridge the ten using partitioning.**	 Model using dienes , place value counters and numicon This should be shown on a part, part whole frame. 36 + 25  Note that the tens should form one part and the ones should be partitioned into the next part to help to physically partition the number.	 Use number line and bridge ten using part whole if necessary. Chidlren to represent the base 10 in a place value chart. 	Looking for ways to make 10. 36 + 25= 30 + 20 = 50 5 + 5 = 10 50 + 10 + 1 = 61 1 5 36 (A6: Expanded Column) 57 + 25 12 70 82 (A7: Column Addition) 57 + 25 82
Add and subtract numbers using concrete objects, pictorial representations mentally, including a two-digit number and ones; a two-	 Combine to make 10 first if possible, or bridge 1o then add third digit		4 + 7 + 6 = 10 + 7 10 = 17 Combine the two numbers that make/ bridge ten then add on the third. Encourage this as a mental strategy.

digit number and tens; two two-digit numbers adding three one-digit numbers. **Add three 1-digit numbers** **Mental strategy**			

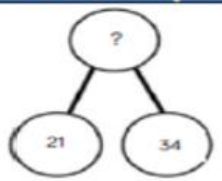
Year 3 Addition			
Objective and strategy	Concrete	Pictorial	Abstract
Add and subtract numbers with up to three digits using formal written methods of columnar addition and subtraction. **Not bridging the ten.** **Move the children on if they have already grasped this from year 2.**	 Model using Dienes or numicon Add together the ones first, then the tens.   Move to using place value counters Use the place value counters on a place value grid as opposed to a part whole frame.	Children move to drawing the counters using a tens and one frame. 	1 21 + 77 77 +121 Children should use a place value grid (or labelled column on squares in their books) and write the numbers into the correct colmns to add them.

Add and subtract numbers with up to three digits using formal written methods of columnar addition and subtraction. **Bridging the ten and regrouping.**	 Place value grids to be drawn by the children unless this hinders presentation. Encourage the children to begin to draw using a ruler.	Chidren to represent the counters in a place value chart, circling when they make an exchange. 	Start by partitioning the numbers for mental addition at this point. 20 + 5 40 + 8 60 + 13 = 73 

Year 4-6 Addition			
Objective and strategy	Concrete	Pictorial	Abstract
Year 4 Add and subtract numbers with up to 4 digits using formal written methods of columnar addition and subtraction where appropriate. **Use partitioning.**	 Children continue to use dienes or place value counters to add, exchange ten ones for a ten and ten tens for a hundred and ten hundreds for a thousand.	 Draw representations using pv grid.	 Continue from previous work to carry hundreds as well as tens.

Year 5 Add and subtract whole numbers with more than 4 digits including using formal written methods of columnar addition and subtraction. **Add decimals with 2 decimal places, including money.**	 Introduce decimal place value counters and model exchange for addition.	 This should be represented using a clearly drawn grid.	
Year 6 Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why. **Including adding place holders.**	As year 5	As year 5	

Conceptual variation; different ways to ask children to solve 21 + 34



?	
21	34

Word problems:
In year 3, there are 21 children and in year 4, there are 34 children.
How many children in total?

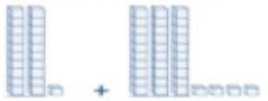
21 + 34 = 55. Prove it

21
+34

21 + 34 =

☐ = 21 + 34

Calculate the sum of twenty-one and thirty-four.

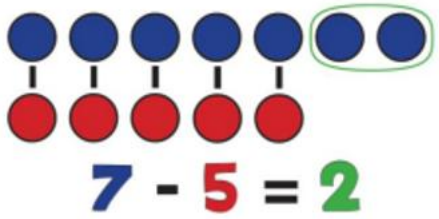
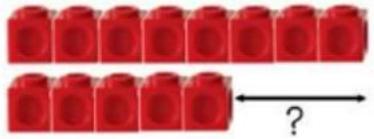
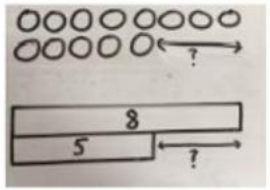
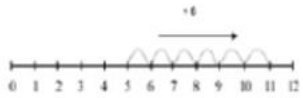
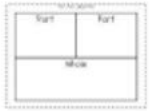
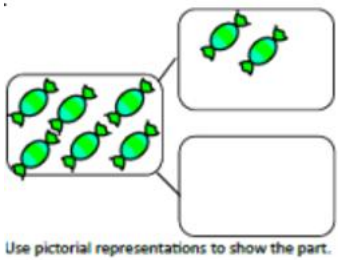
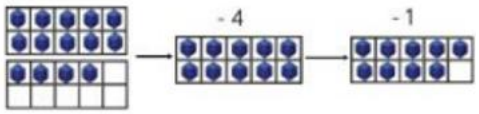
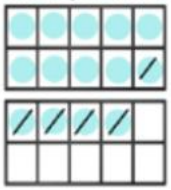


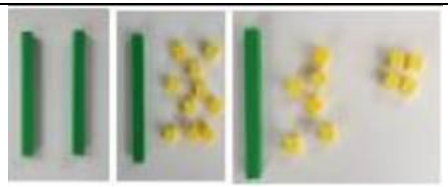
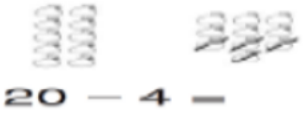
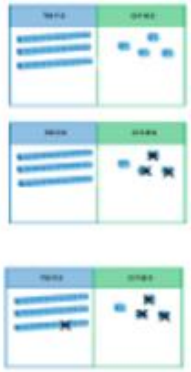
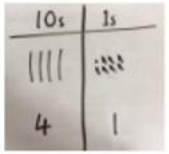
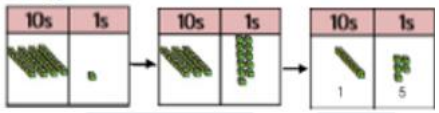
Missing digit problems:

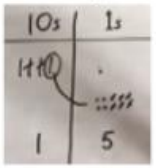
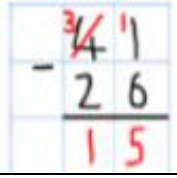
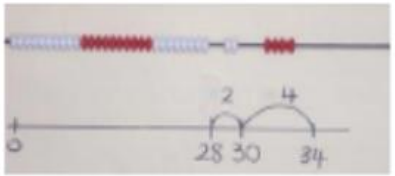
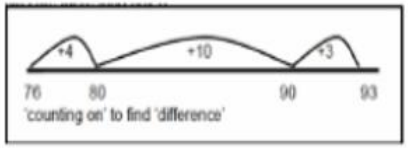
10s	1s
	1
	?
?	5

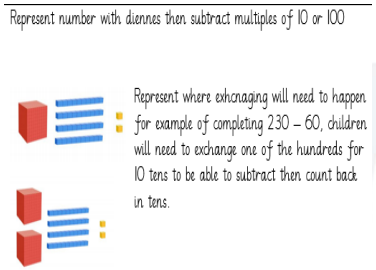
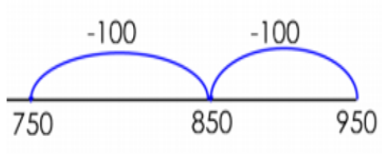
Consider varied fluency at the abstract level of each objective. The abstract method is at fluency level of the objective and should be applied to reasoning and then pr
solving in order to encourage deeper thinking within the method.

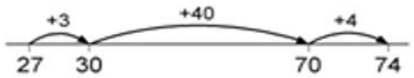
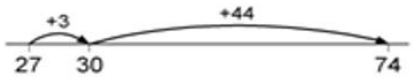
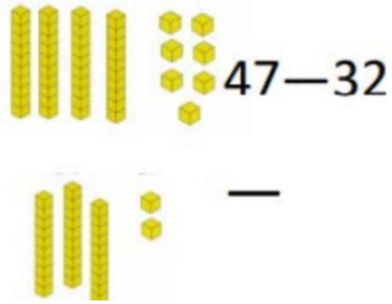
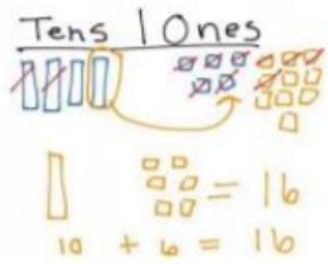
Year 1 Subtraction			
Objective and Strategy	Concrete	Pictorial	Abstract
Add and subtract 1-digit numbers to 10 including zero. **Taking away ones.**	Use physical objects, counters , cubes etc to show how objects can be taken away. 6—4 = 2 4—2 = 2 4 - 3 = 1	Children to draw the concrete resources they are using and cross out the correct amount. The bar model can also be used. S1: Objects 7 - 3 = 4	4- 3 = = 4 - 3 Use the part whole frame to model that the first number is the whole. 7—4 = 3 16—9 = 7
Add and subtract 1-digit numbers to 20 including zero. **Counting back.**	Move objects away from the group, counting backwards. Move the beads along the bead string as you count backwards. children start with 6 and count back 2. 6 - 2 = 4	S3: Counting Back 9 10 11 12 -1 -1 -1 12 - 3 = 9 Children to represent what they see pictorially e.g.	Children to represent the calculation on a number line or number track and show their jumps. Encourage children to use an empty number line 6 – 2 = 4 The number line should always increase in value from left to right

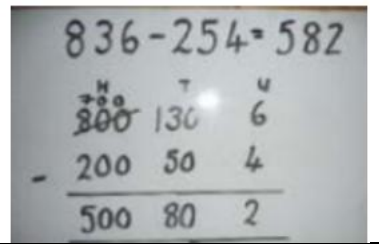
To solve one step problems that involve addition and subtraction using concrete objects and pictorial representations and missing number problems. **Finding the difference.**	**S2: What's the Difference?**  7 - 5 = 2 "How many more is 7 than 5? What is the difference?" Calculate the difference between 8 and 5. 	Children to draw the cubes/other concrete objects which they have used or use the bar model to illustrate what they need to calculate.  Count on using a number line to find the difference. 	Find the difference between 8 and 5. 8 – 5, the difference is ☐ Children to explore why 9 - 6 = 8 – 5 = 7 – 4 have the same difference.
Represent and use number bonds and related subtraction facts (within 20). **Part, part whole.**	 Link to addition. Use PPW model to model the inverse.  If 10 is the whole and 6 is one of the arts, what s the other part? 10—6 = 4	 Use pictorial representations to show the part.	Move to using numbers within the part whole model.  12 5 7
Read, write and interpret mathematical statements involving +,- and = Making 10. Mental strategy.	14 - 5  - 4 - 1 Make 14 on the ten frame. Take 4 away to make ten, then take one more away so that you have taken 5.	Children to present the ten frame pictorially and discuss what they did to make 10. 	Children to show how they can make 10 by partitioning the subtrahend. 14 - 5 = 9 4 1 14 - 4 = 10 10 - 1 = 9

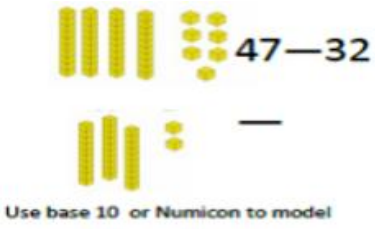
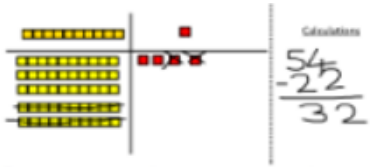
Year 2 Subtraction			
Objective and strategy	Concrete	Pictorial	Abstract
Add and subtract numbers using concrete objects, pictorial representations and mentally, including a two-digit number and ones; a two-digit number and tens; two two-digit numbers; adding three one-digit numbers. **Regroup a ten into ten ones.**			20—4 = 16
Add and subtract numbers using concrete objects, pictorial representations and mentally, including a two-digit number and ones; a two-digit number and tens; two two-digit numbers; adding three one-digit numbers. **Partitioning to subtract without regrouping.**	34—13 = 21 Use Dienes to show how to partition the number when subtracting without regrouping. 	Children to represent the base 10 pictorially.  Encourage expanded column for mental methods. (S10: Expanded Column) 87 - 23 = 64 80 7 20 3 60 4	Column method or children could count back 7. 4 8 − 7 4 1
Show that the addition of the two numbers can be done in any order (commutative) and subtraction of the one number from another cannot.	41 - 26 		

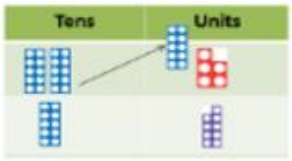
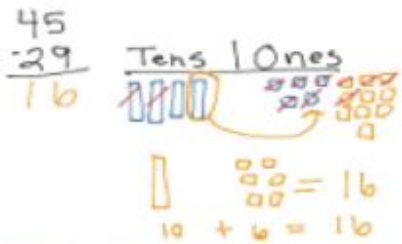
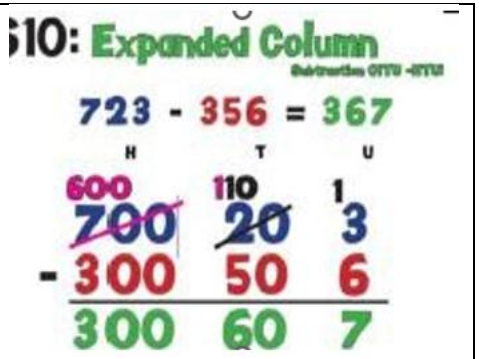
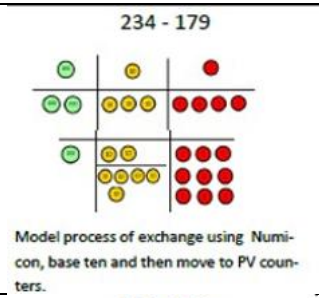
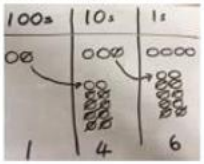
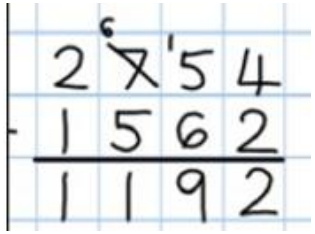
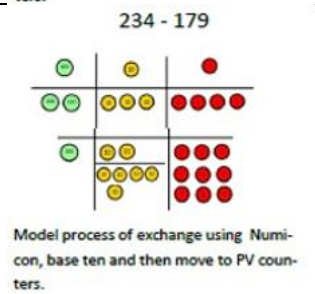
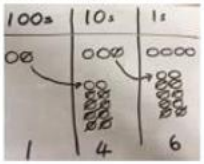
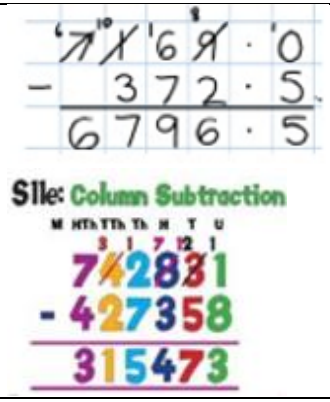
Column method having to regroup.		Represent the base 10 pictorially, remembering to show the exchange.  	Formal column method. Children must understand that when they have exchanged the 10 they still have 41 because 41 = 30 + 11. 
Add and subtract numbers using concrete objects, pictorial representations and mentally including a two-digit number and ones; a two-digit number and tens; two two-digit numbers; adding three one-digit number. **Make ten strategies.** **Mental strategy.**	 34—28 Use a bead bar or bead strings to model counting to next ten and the rest.	 Use a number line to count on to next ten and then the rest.	93—76 = 17

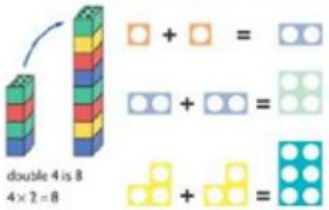
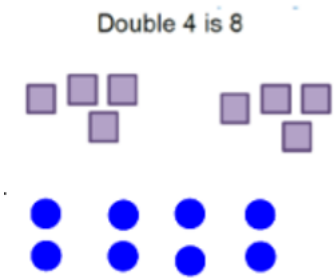
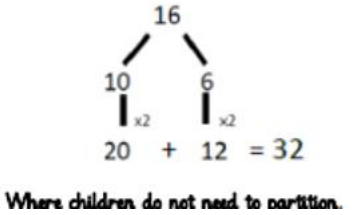
Year 3 Subtraction			
Objective and strategy	Concrete	Pictorial	Abstract
Add and subtract a three-digit number and a multiple of one hundred mentally (up to 1000). Mentally add and subtract a 3-digit number and ones, 3-digit number	 	 	950 – 200 = 750 Place a number in head then count back in multiples of 10/100

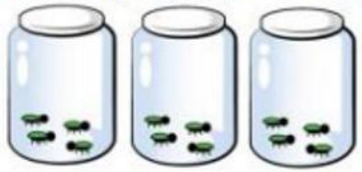
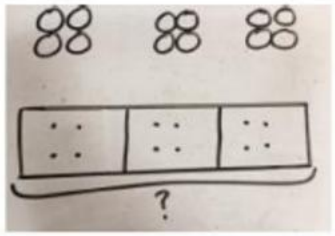
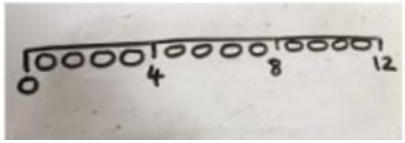
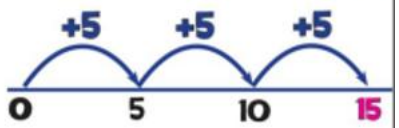
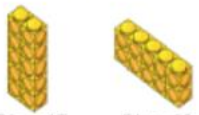
and tens, 3-digit number and hundreds			
Solve addition and subtraction problems using number facts and place value. **Counting up to solve problems and find the difference**.	74 - ? = 27 Use diennes to add ones and tens.	 or: 	This can then be completed mentally by counting on, using number facts, in their head.
Add and subtract numbers with 2 digits, using formal written methods of columnar addition and subtraction **without bridging 10.** **Without grouping.**		Draw diennes, alongside using them, tp support pictoral representations.  43—21 = 22	Use the expanded method to support knowledge and representation of place value 47 – 32 = 40 7 - 30 2 10 5 = 15
Add and subtract numbers with 2 digits, using formal written methods of columnar addition and subtraction without bridging 10 (With exchanging)	**Column method** (using base 10 and having to exchange) **45-26**  1) Start by partitioning 45 2) Exchange one ten for ten more ones 3) Subtract the ones, then the tens. This can also be done with place value counters or numicon	 45 – 2 Exchange one of the tens for ten more ones t able to subtract the ones.	Use the expanded method to support knowledge and representation of place value 60 14 ~~70~~ + ~~4~~ - 20 + 7 40 + 7 = 47

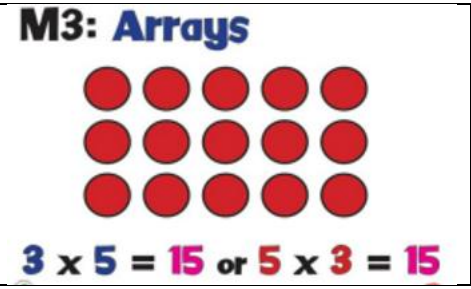
Add and subtract numbers with up to 3 digits, using formal written methods of columnar addition and subtraction	Use diennes or place value counters as above	Use diennes or place value counters as above	Use Expanded method as above 

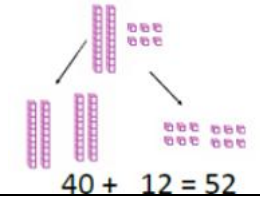
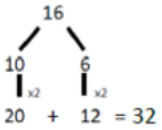
Year 4-6 Subtraction			
Objective and Strategy	Concrete	Pictorial	Abstract
Add and subtract numbers mentally including a three-digit number and ones; a three-digit number and tens; a three-digit number and hundreds. **Column subtraction without regrouping**	 Use base 10 or Numicon to model	 Darw representations to support under-standing	

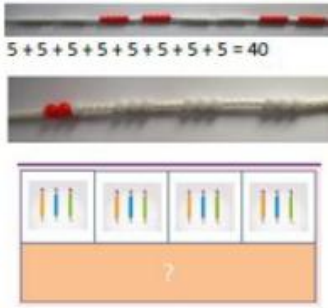
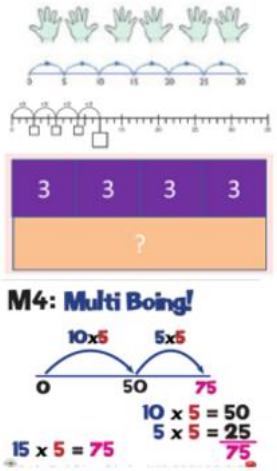
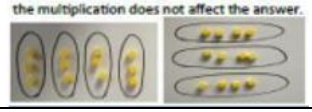
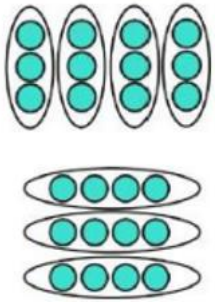
Add and subtract numbers with up to three digits using formal written methods of columnar addition and subtraction. **Columnar subtraction with regrouping.**	 Begin with base 10 or Numicon. Move to pv counters, modelling the exchange of a ten into tten ones. Use the phrase 'take and make' for exchange.	 Children may draw base ten or PV counters and cross off.	
Year 4 Add and subtract numbers up to 4 digits using formal written methods of columnar addition and subtraction where appropriate. **Regrouping.**	 Model process of exchange using Numicon, base ten and then move to PV counters.	Represent the place value counters pictorially; remembering to show what has been exchanged. 	
Year 5 Add and subtract whole numbers with more than 4 digits, including using formal written methods, (Columnar addition and subtraction). **Regrouping.**	 Model process of exchange using Numicon, base ten and then move to PV counters.	Represent the place value counters pictorially; remembering to show what has been exchanged. 	

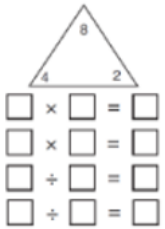
Year 1 Multiplication			
Objective and Strategy	Concrete	Pictorial	Abstract
Solve one step problems involving multiplication and division by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher. **Doubling.**	Use practical activities using manipulatives including cubes and Numicon to demonstrate doubling  	Draw pictures to show how to double numbers.  	Partition a number and then double each part before recombining it back together.  Where children do not need to partition.
Count in multiples of twos, fives and tens.	Count the groups as children are skip counting, children may use their fingers as they are skip counting. 	Children make representations to show counting in multiples. 	Count in sequences of numbers out loud. Encourage the children to begin any number – 46, 56, 66, 76 etc 2, 4, 6, 8, 10 5, 10, 15, 20, 25 , 30

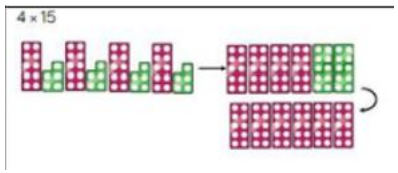
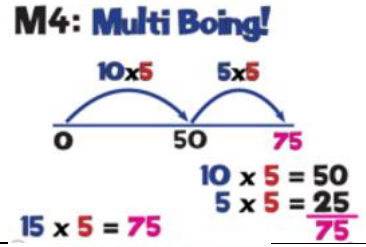
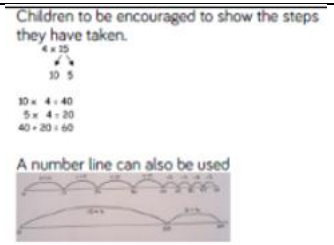
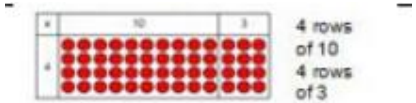
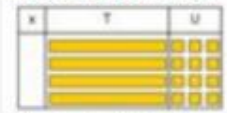
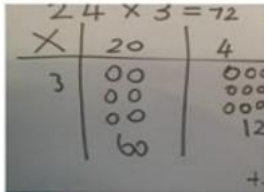
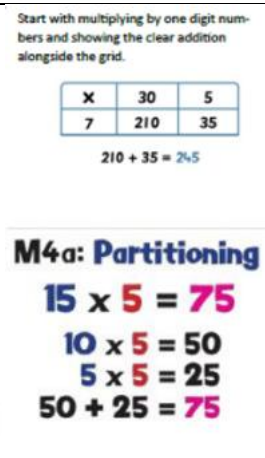
Count in multiples of twos, fives and tens. Repeated grouping. Repeated addition.	3 × 4 4 + 4 + 4 There are 3 equal groups, with 4 in each group.  **M1: Repeated Addition** (Groups)  **5 x 3 = 5 + 5 + 5 = 15**	Children to represent the practical resources in a picture and use a bar model. 	3 × 4 = 12 4 + 4 + 4 = 12 3 + 3 + 3 + 3 = 12
Count in multiples of twos, fives and tens. Number lines to show repeated groups. Children do not need to record he number line at abstract level if they do not need to.	3 × 4  Cuisenaire rods can be used too.	Represent this pictorially alongside a number line e.g.: 	**M2: Repeated Addition** (Number Line)  **5 x 3 = 5 + 5 + 5 = 15**
Solve one step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays	Counters and other objects can be used 2 × 5 = 5 × 2  2 lots of 5 5 lots of 2		Children to be able to use an array to write a range of calculations e.g. 10 = 2 × 5 5 × 2 = 10 2 + 2 + 2 + 2 + 2 = 10 10 = 5 + 5

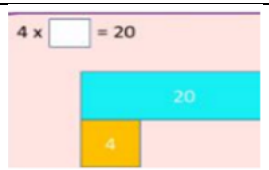
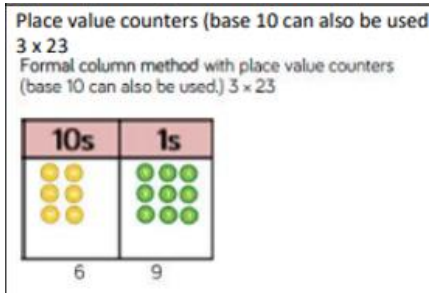
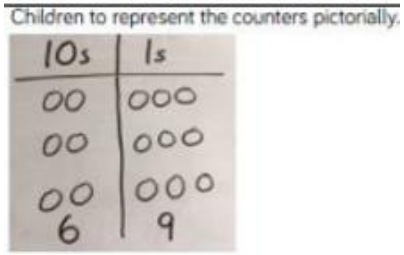
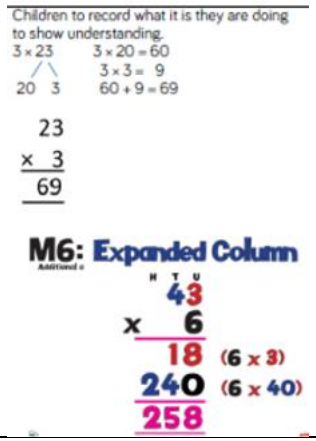
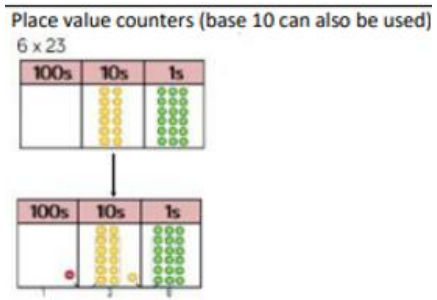
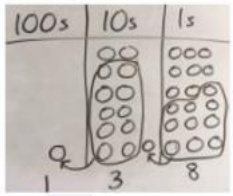
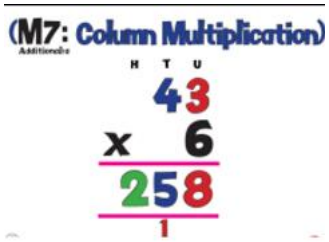
with the support of the teacher. Use arrays to show commutativity.			

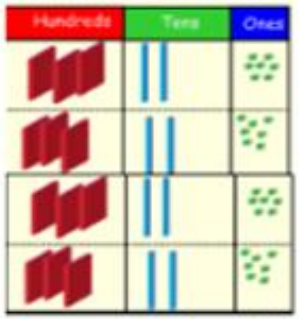
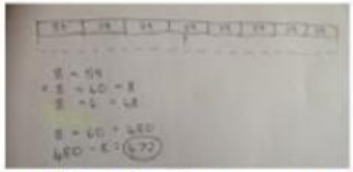
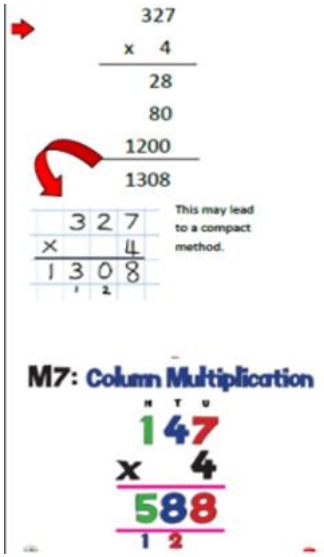
Year 2 Multiplication			
Objective and Strategy	Concrete	Pictorial	Abstract
Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables. Doubling to multiply by 2, 4 and 8.	Model doubling using dienes and PV counters. 	Draw pictures and representations to show how to double numbers.	Partition a number and then double each part before recombining it back together. 

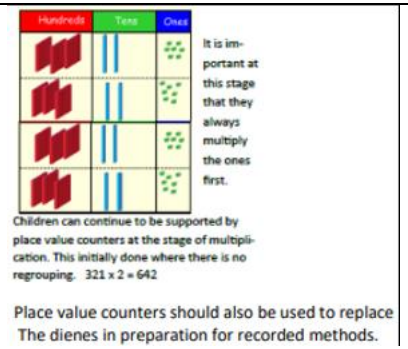
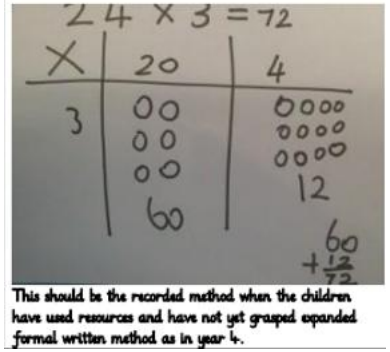
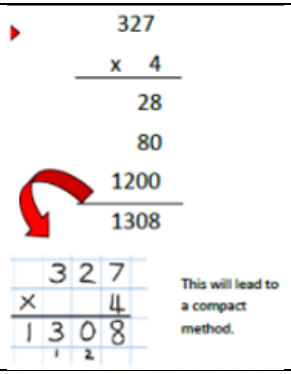
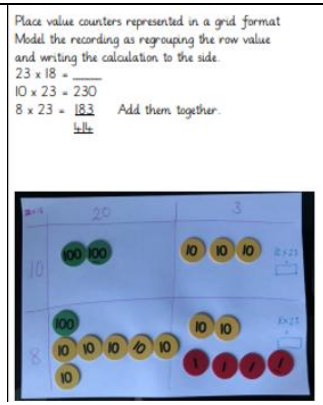
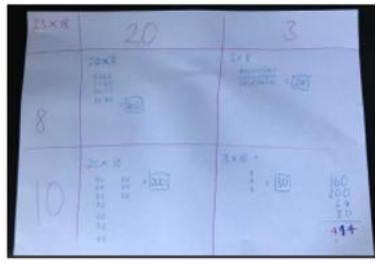
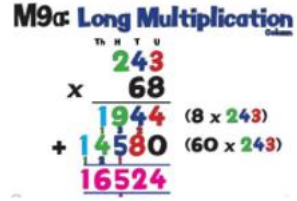
Recall and use multiplication and division facts for the 2, 5 and 10 times tables, including recognising odd and even numbers. **Repeated addition.**	Count the groups as children are skip counting, children may use their fingers as they are skip counting. Use bar models. 	Number lines, counting sticks and bar models should be used to show representation of counting in multiples. 	Count in multiples of a number aloud. Write sequences with multiples of numbers. 0, 2, 4, 6, 8, 10 0, 3, 6, 9, 12, 15 0, 5, 10, 15, 20, 25 , 30 $4 \times 3 = \square$ Encourage varied fluency _ x 4 = 12 8 x _ = 16 Children do not need to draw the number line, multiples out loud confidently.
Show that the multiplication of two numbers can be done in any order (commutative) and division of one number by the other cannot. **Using arrays.**	Create arrays using counters and cubes and Numicon.   Pupils should understand that an array can represent different equations and that, as multiplication is commutative, the order of the multiplication does not affect the answer. 	Use representations of arrays to show different calculations and explore commutativity. 	12 = 3 x 4 12 = 4 x 3 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

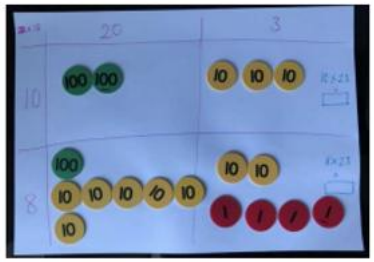
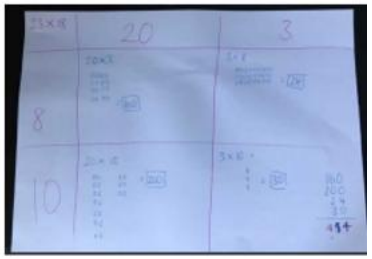
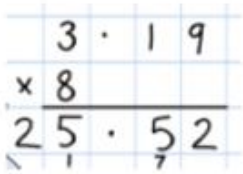
Show that the multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot. **Using the inverse to check.**	 Use grouping and sharing to check facts in a concrete format		2 x 4 = 8 4 x 2 = 8 8 ÷ 2 = 4 8 ÷ 4 = 2 8 = 2 x 4 8 = 4 x 2 2 = 8 ÷ 4 4 = 8 ÷ 2 Show all 8 related fact family sentences.

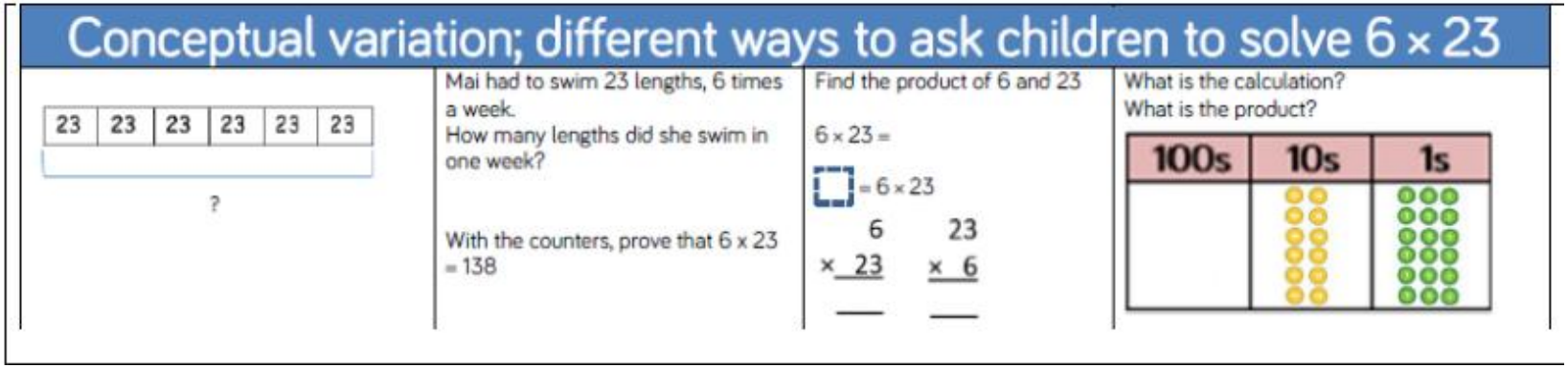
Year 3 Multiplication			
Objective and Strategy	Concrete	Pictorial	Abstract
Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot. **Partition and multiply.**			
Write and calculate mathematical statements for multiplication and division using the multiplication tables they know, including for two-digit numbers times one-digit numbers, using mental methods and progressing to formal written methods. **Partitioning** **Mental method.**	 Move onto base ten to move towards a more compact method.  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	 Children can represent their work using counters in a way they understand.	

		 A bar model is used to show missing number.	
Write and calculate mathematical statements for multiplication and division using the multiplication tables they know, including for two-digit numbers times one-digit numbers, using mental methods and progressing to formal written methods. **Formal column multiplication. (Expanded method).**			
Write and calculate mathematical statements for multiplication and division using the multiplication tables they know, including for two-digit numbers times one-digit numbers, using mental methods and progressing to formal written methods. **Formal column multiplication.**			

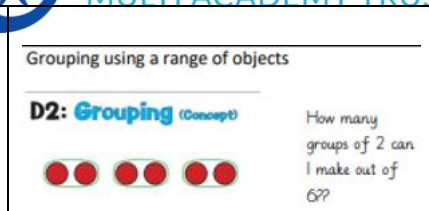
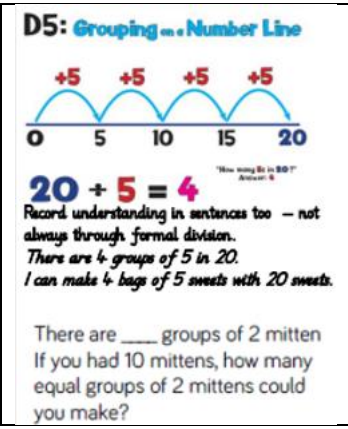
Year 4 Multiplication			
Objective and Strategy	Concrete	Pictorial	Abstract
Multiply two digit and three-digit numbers by a one-digit number using formal written layout. Formal written method.	Children can continue to be supported by place value counters at the stage of multiplication. This initially done where there is no regrouping. 321 x 2 = 642  It is important at this stage that they always multiply the ones first. The corresponding long multiplication is modelled alongside	 Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods.	

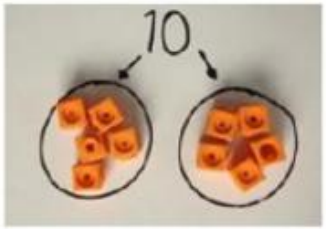
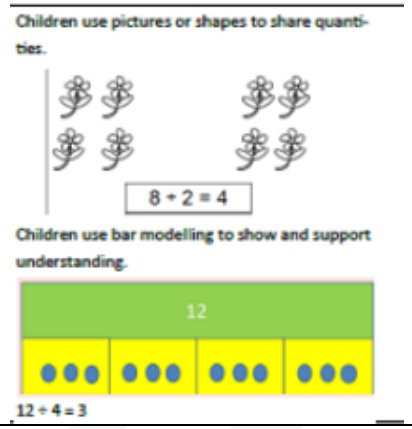
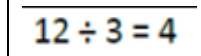
Year 5 and 6 Multiplication			
Objective and Strategy	Concrete	Pictorial	Abstract
Multiply numbers up to four-digits by one- or two-digit numbers using formal written methods including long multiplication for two-digit numbers. **Formal written method.**			
Multiply numbers up to four-digits by one- or two-digit numbers using formal written methods including long multiplication for two-digit numbers. **Formal written method.**			

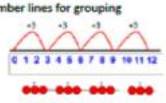
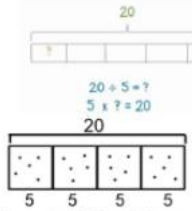
Year 6 Multiplication			
Objective and Strategy	Concrete	Pictorial	Abstract
Multiply multi-digit number up to 4-digits by a 2-digit number using formal written method of long multiplication. **Long multiplication.**	Place value counters represented in a grid format Model the recording as regrouping the row value and writing the calculation to the side. 23 x 18 = ____ 10 x 23 = 230 8 x 23 = 184 Add them together. 	Place value counters represented in a grid format 	Remind children that the single digit belongs in the units column. Line up the decimal points in the question and the answer. 

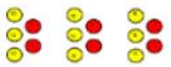
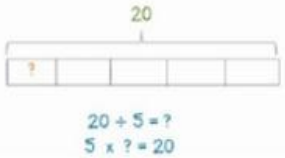


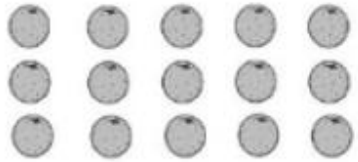
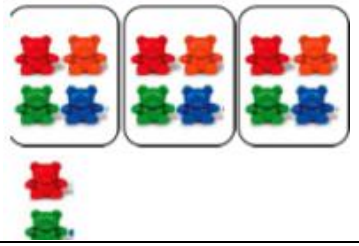
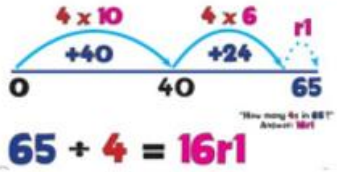
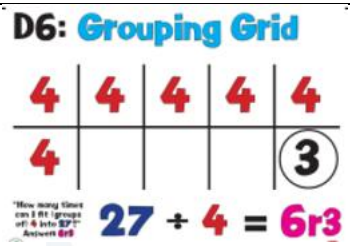
Year 1 Division			
Objective and Strategy	Concrete	Pictorial	Abstract
Solve one step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with support of the teacher. **Division by sharing.**	Sharing using a range of objects **D1: Sharing** (Concept) "If I share 6 into 2 equal amounts, how many in each group?" Answer: 3 If I share 6 into 2 equal amounts. How many in each group? 10	Represent the sharing pictorially. ? 8 ÷ 2 = 4 Children should be encouraged to draw their group as a bar model.	6 ÷ 2 = 3 3 3 Children should also be encouraged to use their 2 times tables facts.

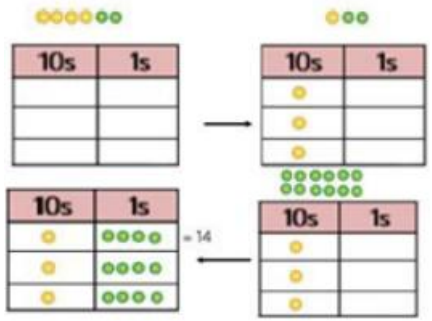
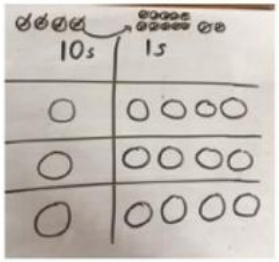
Solve one step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with support of the teacher. **Division as grouping.**		Children should be encouraged to group using times tables facts. They should draw crosses into boxes in their book and group by circling.	

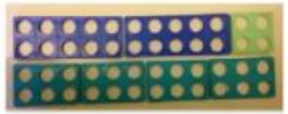
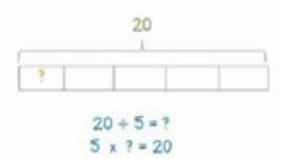
Year 2 Division			
Objective and Strategy	Concrete	Pictorial	Abstract
Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods and multiplication and division facts. Include problems in context. **Division as sharing.**			

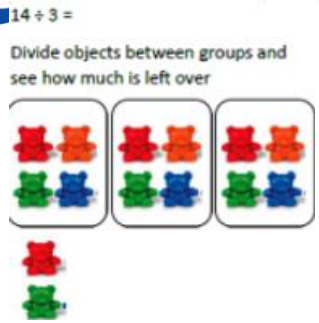
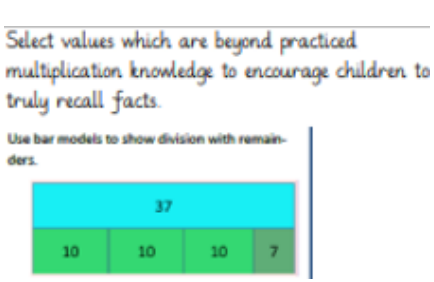
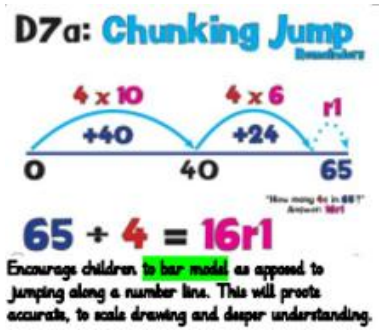
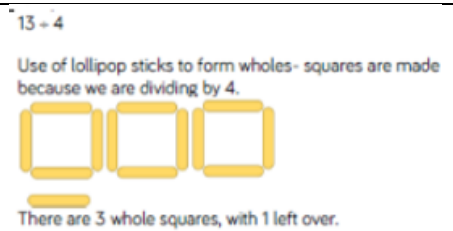
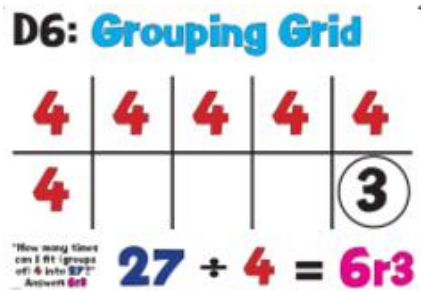
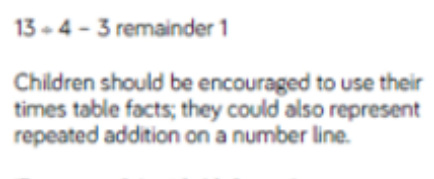
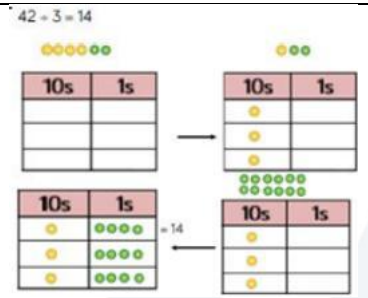
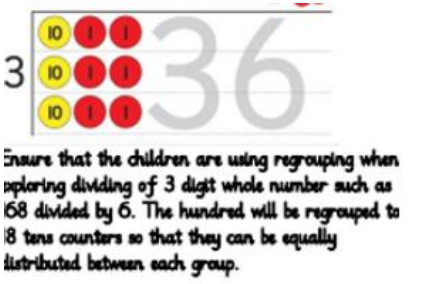
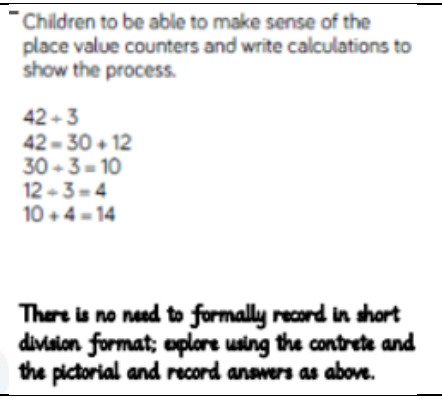
Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods and multiplication and division facts. Include problems in context. **Division as sharing.**	Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding.  	Use number lines for grouping  12 ÷ 3 = 4 Think of the bar as a whole. Split it into the number of groups you are dividing by and work out how many would be within each group.  Encourage children to bar model as apposed to jumping along a number line. This will promote accurate, to scale drawing and deeper understanding.	28 ÷ 7 = 4 Divide 28 into 7 groups. How many are in each group? Record understanding in sentences too – not always through formal division. *There are 4 groups of 5 in 20.* *I can make 4 bags of 5 sweets with 20 sweets.*

Year 3 Division			
Objective and Strategy	Concrete	Pictorial	Abstract
Show that multiplication of two numbers can be done in any order (commutative) and division by one number cannot. **Division by grouping.**	Use cubes, counters, objects or place value counters to aid understanding.  24 divided into groups of 6 = 4 96 ÷ 3 = 32 	Continue to use bar modelling to aid solving division problems.  Encourage children to bar model as apposed to jumping along a number line. This will promote accurate, to scale drawing and deeper understanding.	How many groups of 6 in 24? 24 ÷ 6 = 4

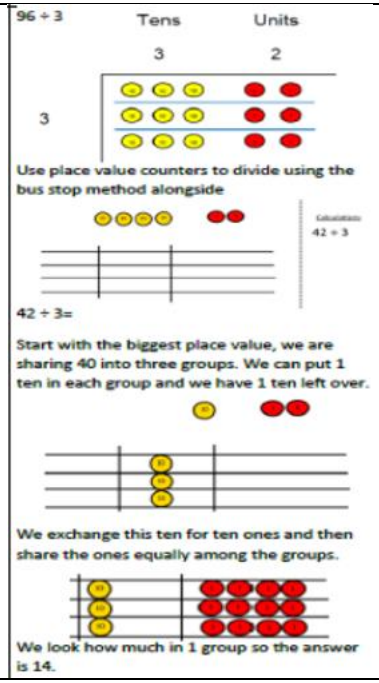
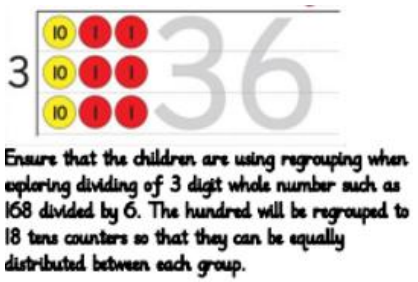
Solve problems involving multiplication and division using materials, arrays, repeated addition, mental methods and multiplication and division facts, including problems in context. **Use arrays.**	 ink division to multiplication by creating an rray and thinking about the number sentenc s that can be created. g 15 ÷ 3 = 5 5 x 3 = 15 15 ÷ 5 = 3 3 x 5 = 15	Draw an array and use lines to split the array into groups to make multiplication and division sentences 	Find the inverse of multiplication and division sentences by creating eight linking number sentences. 7 x 4 = 28 4 x 7 = 28 28 ÷ 7 = 4 28 ÷ 4 = 7 28 = 7 x 4 28 = 4 x 7 4 = 28 ÷ 7 7 = 28 ÷ 4
Solve problems involving multiplication and division using materials, arrays, repeated addition, mental methods and multiplication and division facts, including problems in context. **Division with remainders.**	14 ÷ 3 = Divide objects between groups and see how much is left over 	Use bar models to show division with remainders.  Select values which are slightly beyond practiced multiplication knowledge to encourage children to truly recall facts.	D7a: Chunking Jump  65 ÷ 4 = 16r1 Encourage children to bar model as opposed to jumping along a number line. This will promote accurate, to scale drawing and deeper understanding.
Solve problems involving multiplication and division using materials, arrays, repeated addition, mental methods and multiplication and division facts, including problems in context. **Division with remainders, varied fluency.**	13 ÷ 4 Use of lollipop sticks to form wholes- squares are made because we are dividing by 4.  There are 3 whole squares, with 1 left over.	D6: Grouping Grid  27 ÷ 4 = 6r3	13 ÷ 4 = 3 remainder 1 Children should be encouraged to use their times table facts; they could also represent repeated addition on a number line. '3 groups of 4, with 1 left over'

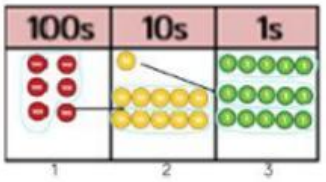
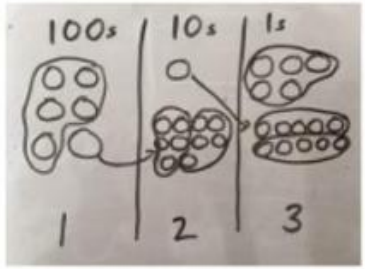
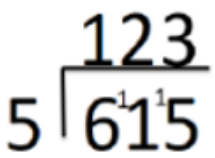
Solve problems involving multiplication and division using materials, arrays, repeated addition, mental methods and multiplication and division facts, including problems in context. **Division with remainders, varied fluency and regrouping.**	42 ÷ 3 = 14 	Children to represent the place value counters pictorially. 	Children to be able to make sense of the place value counters and write calculations to show the process. 42 ÷ 3 42 = 30 + 12 30 ÷ 3 = 10 12 ÷ 3 = 4 10 + 4 = 14

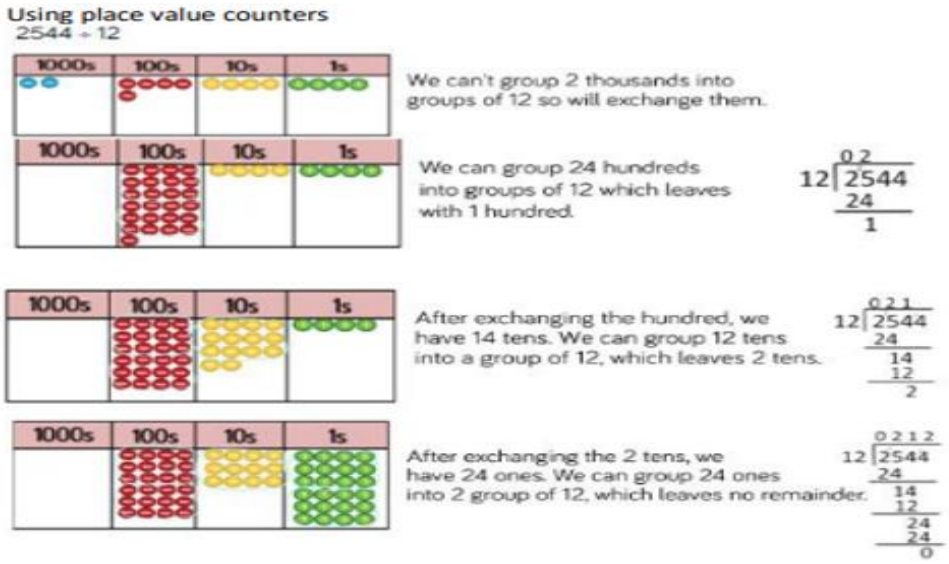
Year 4 Division			
Objective and Strategy	Concrete	Pictorial	Abstract
Show that multiplication of two numbers can be done in any order (commutative), and division of one number cannot. **Division by grouping.**	Use cubes, counters, objects or place value counters to aid understanding.  24 divided into groups of 6 = 4 96 ÷ 3 = 32 	Continue to use bar modelling to aid solving division problems.  Encourage children to bar model as apposed to jumping along a number line. This will promote accurate, to scale drawing and deeper understanding.	How many groups of 6 in 24? 24 ÷ 6 = 4

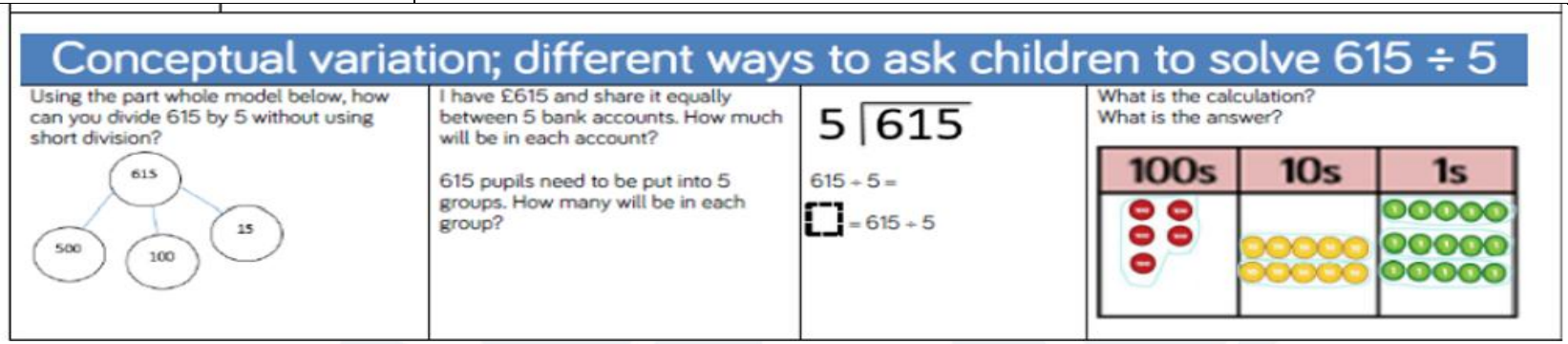
Solve problems involving multiplication and division using materials, arrays, repeated addition, mental methods and multiplication and division facts, including problems in context. **Division with remainders.**			
Solve problems involving multiplication and division using materials, arrays, repeated addition, mental methods and multiplication and division facts, including problems in context. **Division with remainders, varied fluency.**			
Solve problems involving multiplication and division using materials, arrays, repeated addition, mental methods and multiplication and division facts, including problems in context. **Division with remainders, varied fluency and regrouping.**			

Must move the children onto dividing 3-digit numbers.			
Solve problems involving multiplication and division using materials, arrays, repeated addition, mental methods and multiplication and division facts, including problems in context. Dividing by 10.	Use dienes or place value counters to divide a whole number by ten.  Regroup in order show how many tens are making up the value. Use multiples of ten and hundred only.	Use of a place value sliding grid. Ensure that the children understand that this is the same as regrouping. Use the concrete resources to reinforce this. 	50 ÷ 10 = 5 700 ÷ 10 = 70 _ ÷ 10 = 5 _ ÷ 10 = 45 A place value slider should be used to support this if needed.

Year 5 Division			
Objective and Strategy	Concrete	Pictorial	Abstract
Divide numbers up to 4-digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context. **Short division without exchange.**			$$3\overline{)3600}\quad 120$$

Divide numbers up to 4-digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context. **Short division with exchange.**	615 ÷ 5  1. Make 615 with place value counters. 2. How many groups of 5 hundreds can you make w hundred counters? 3. Exchange 1 hundred for 10 tens. 4. How many groups of 5 tens can you make with 11 counters? 5. Exchange 1 ten for 10 ones. 6. How many groups of 5 ones can you make with 1	Represent the place value counters pictorially  	Children to the calculation using the short division scaffold. 

Year 6 Division			
Objective and Strategy	Concrete	Pictorial	Abstract
Divide numbers up to 4-digits by a 2-digit whole number using the formal written method of long division and interpret remainders as whole number remainder, fractions or rounding as appropriate for the context. **Divide up to 4-digit by a 2-digit number.**			



Impact

Formative assessment of a learner's progress takes place during each lesson through questioning, observation and written outcomes. As part of the Marking and Feedback policy, verbal feedback is given to the learners regularly and over the shoulder marking happens where necessary so that immediate feedback can be given and acted upon. Learners are formally assessed against identified criteria three times per year and this is used to identify gaps or misconceptions that they have in their learning and use this to inform future planning.

These assessments inform the summative assessment that teachers make at the end of each academic year. As a result, learners make rapid and sustained progress from their relative starting points. Lessons and outcomes are monitored frequently by the Senior Leadership Team, along with pupil voice discussions, and evaluations of these are used to continually enhance our maths curriculum design and delivery.

Breach of Policy

Any breaches of this Policy will be managed under the Trust's Disciplinary Policy and Procedure, which can be located in the All MAT Staff area on Teams.