ST NICHOLAS OF TOLENTINE CALCULATION POLICY

~choosing the best representation for the maths~

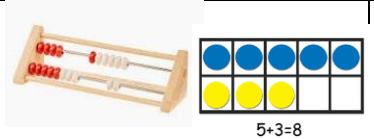
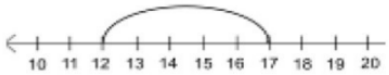
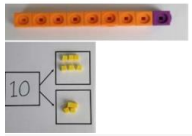
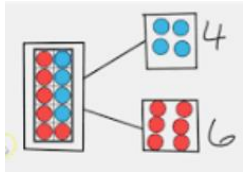
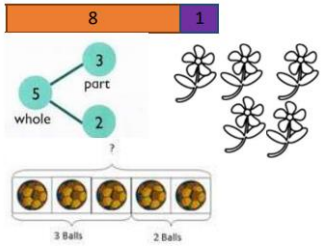
NB: Pictorial can be a representation of the concrete where possible

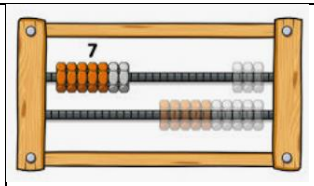
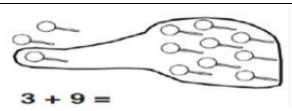
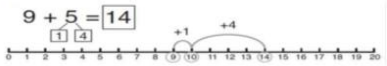
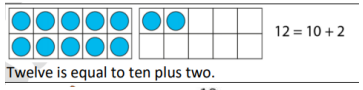
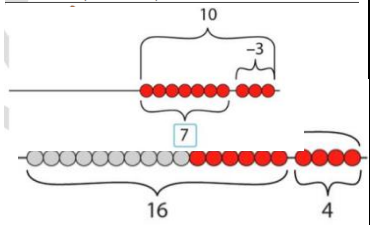
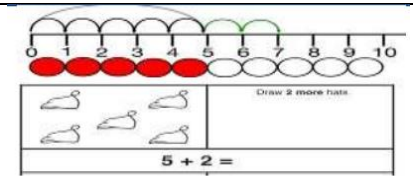
Numberlines are invaluable as they help to secure their understanding of numberlines ready for use across the four operations.

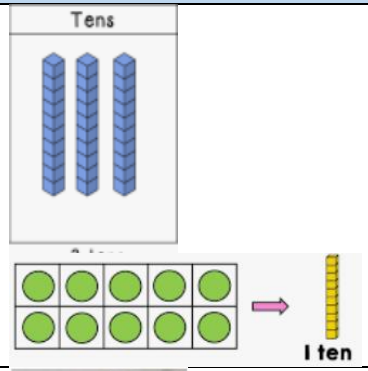
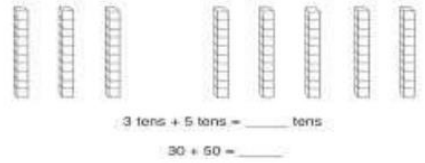
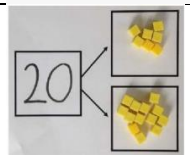
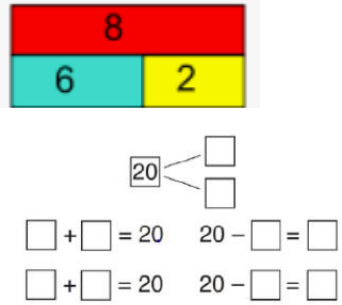
Each time you include a new PV column, model which equipment represents this and how to draw it (eg Hundreds in y3, Thousands in y4 etc)

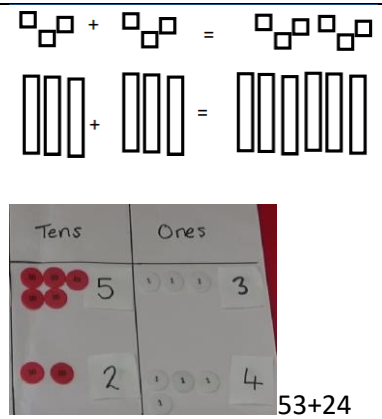
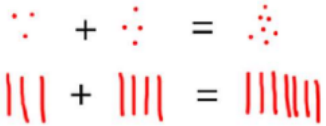
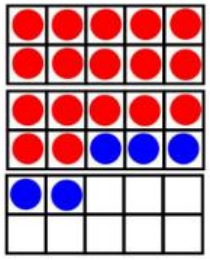
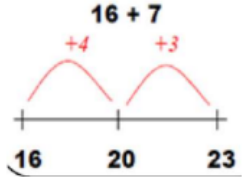
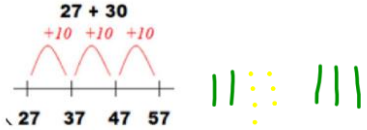
EYFS - Much of the learning will be through manipulatives and concrete objects, with some children moving onto drawing representations. However, the language is crucial at this stage to set a good foundation for KS1. Introducing chn to the more 'standard' concrete resources such as rekenrek, ten frames or Hungarian frames and dienes will be very benefical!	
MATCH SORT COMPARE Same different sort set more fewer Bigger smaller larger taller shorter heavier lighter Holds more/ holds less Capacity pattern	**COUNTING** Count altogether subitise times Made up of part whole
<u>COMPARING</u> The _____ are the same The _____ are different The ___and the ___ match The_____ has the same capacity as_____ **<u>SORTING</u>** The___and the ___ are a set/not a set because_____ I have sorted the objects by___ All my objects are_____ Another way to sort the objects are_____ This belongs/doesn't belong in the set because_____	I counted _____ There is 1 . _____ There are 2/3 . ____ There are ____altogether. I can see.. I can see ____without counting. I can subitise____ We clapped_____ times There are ____ There are ____altogether. ____ is 1 more/less than_____

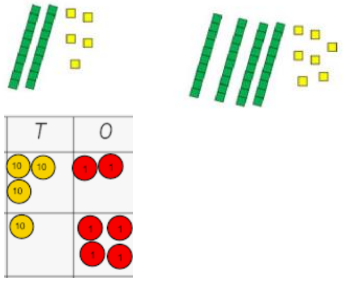
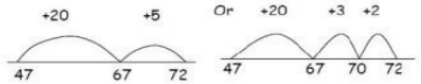
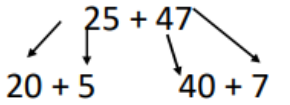
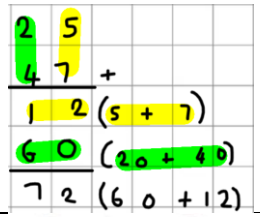
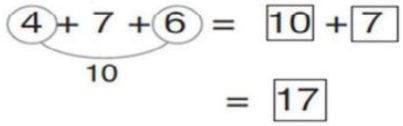
The rule is_____ This set has more/fewer than____ PATTERNS My pattern is ___,____,_____ The ____ comes next in my pattern I have used_____ to make my pattern. Next, I need_____ to continue my pattern. I need___ to finish my pattern. The ____is in the wrong place	I can see _____ is made up of _____ and _____ I can see _____ is made up of _____, _____ and _____ There is _____ here and _____ there so there must be _____ altogether. _____ is a part and _____ is a part. If _____ is a part, then the other part must be _____ _____ is a part of _____ The whole is _____

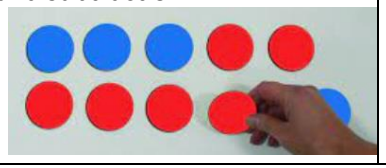
YEAR 1 ADDITION	VOCABULARY: part whole add sum equals count on tens ones plus add more than			
Objective	**Concrete (representation)** Multilink, counters, bead strings, tenframes rekenrek	**Pictorial (process)** Part whole model Bar model numberline	**Abstract** Number sentence	Sentence stems
Counting in ones	 5+3=8 Start with the larger number on the frame and then count on to the smaller number one by one.	Use a number line to count on in ones.  5 6 7 8	**5+ 3 = 8** **8= 5+3**	The last number I said was _____, so there are _____ objects in total. I need to start counting from _____ The number that comes after _____ is _____ I will say the number _____ because … I will not say the number _____ because …
Starting at the bigger number and counting on	As above Encourage children to recognise 5 on the rekenrek or ten frame and the fact they know it so they don't need to count from 1	 10 11 12 13 14 15 16 17 18 19 20 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.	5 + 12 = 17 Place the larger number in your count on the smaller number to answer.	Addend plus addend equals sum. Sum equals addend plus addend. I start at ____ and then count on _____
PLACE VALUE: Combining 2 parts to make a **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.  8 1 3 part 5 whole 2 3 Balls 2 Balls	8 = 5 + 3 5 + 3 = 8  5 3 Use the part part whole diagram as shown above to move into the abstract. Include missing number questions to support varied fluency: 8 = ? + 3 5 + ? = 8	There are ___ ___ in the whole group. There are ___ ___ in this part of the group. ___ is the whole; ___ is a part and ___ is a part. The whole is ___ and one part is ___ so the other part must be ___.

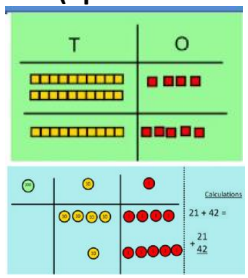
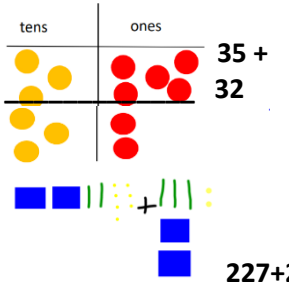
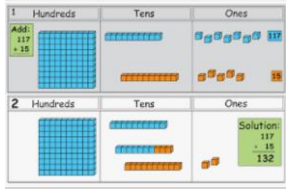
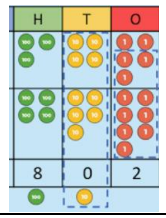
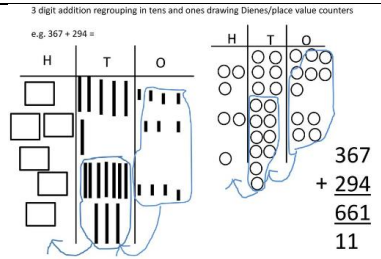
Regrouping to make 10. *This is an essential skill for column addition later*.	 7+ 3 Start with the bigger number and use the smaller number to make ten first  6+4 = 10 then + 1 to make 11	 Use pictures or a number line. Regroup or partition the smaller number using the part, part whole model to make 10. 	7 + 4= 11 If I am at seven, how many more do I need to make 10? How many more do I add on now?	This is ten ones. It is also one ten ___ is five and ___ more. ___ is equal to ten plus ___. I know that ___ plus ___ is equal to ten so ___ plus ___ is equal to ___. I know that 6+4= 10 so I know that 16+4 = 20 *(eg 6+4 = 10 so 16+4=20)*
Represent & use number bonds and related subtraction facts within 20	3 more than 7  Twelve is equal to ten plus two. 		7 – 3 =4 Missing number questions: 10 = ? + 3 7 + ? = 10	____more than ___ is equal to ___. __ more than __ is __. __ is __ more than __. I know that ___ minus ___ is equal to ten so ___ minus ___ is equal to ___. (*eg 10 – 4 = 6 so 20-4=16)*

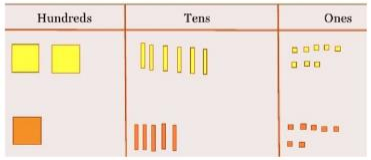
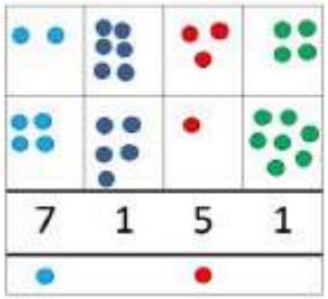
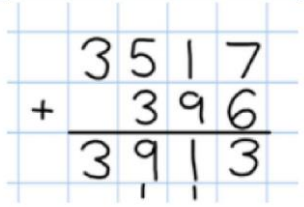
YEAR 2 ADDITION	NEW VOCABULARY: partition bar model multiple of ten Fact family total inverse commutative count in steps count in multiples estimate compare sum digit addend subtrahend minuend			
Objective	**Concrete** , tenframes dienes/base ten place value counters Place value chart	**Pictorial** Drawn representations for base ten Bar models Part whole models numberlines	**Abstract** Number sentence Missing number problems Column method partition	Sentence stems
Adding multiples of ten		 Use representations for base ten.	20 + 30 = 50 70 = 50 + 20 40 + □ = 60	I know __+___ is ___ so I know ___tens +____ tens is___tens (eg 3+2 = 5 so 30+50= 80)
Use known number facts			Explore commutativity of addition by swapping the addends to build a fact family. Explore the concept of the inverse relationship of addition and subtractions and use this to check calculations. □ + 1 = 16 16 − 1 = □ 1 + □ = 16 16 − □ = 1	I know that ___ plus ___ is equal to ten so ___ plus ___ is equal to ___. I know that 6+4= 10 so I know that 16+4 = 20 *(eg 6+4 = 10 so 16+4=20)* I know that ___ minus ___ is equal to ten so ___ minus ___ is equal to ___. (*eg 10 – 4 = 6 so 20-4=16)*

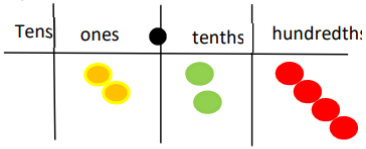
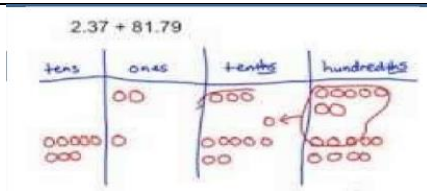
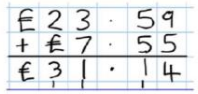
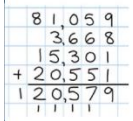
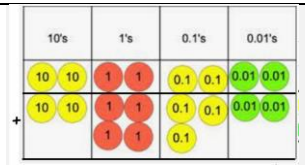
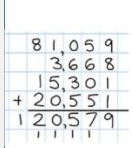
	 53+24		3 + 4 = 7 *leads to* 30 + 40 = 70 *leads to* 300 + 400 = 700	I know that ___ plus ___ is equal to ten so ___ plus ___ is equal to ___. I know that 6+4= 10 so I know that 16+4 = 20 *(eg 6+4 = 10 so 16+4=20)* I know that ___ minus ___ is equal to ten so ___ minus ___ is equal to ___. (*eg 10 – 4 = 6 so 20-4=16)*
Add a two digit number and ones	 eg: 17+ 5 Use the ten frame to make ten Explore the pattern: 17+5 27+ 5 37+5 etc	 Use a numberline to model making the next ten and then adding the remainder of the number. Continue to explore the pattern: 16+ 7 26+ 7 36+ 7 etc	16+ 7 16 + 4 = 20 20+ 3 = 23	___ can be partitioned into ___and ___ The multiple of 10 after _____ is _____ I need to add _____ to get to the next 10 _____ + _____ = _____ I need to add _____ more. So _____ + _____ = _____
Add a 2 digit number and tens	 25 + 10 = 35 Explore that the ones digit does not change	 Use a numberline to model adding ten (to add multiples of ten) Draw the dienes and count the tens aloud as they are added.	27 + 10 = 37 27 + 20 = 47 27 + □ = 57 How many tens do I need to add to 34 to reach 74?	If I add one more ten, the digit in the ones place stays the same.

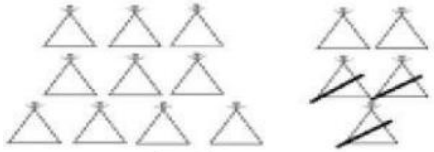
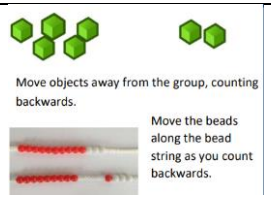
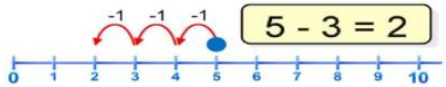
Add 2 two-digit numbers	Partition the number into tens and ones using dienes (or PV counters when chn are secure with dienes)  NB: dienes are easier to draw in the pictorial stage than PV counters	 Use number line and bridge ten using part whole if necessary.	 20 + 40 = 60 5+ 7 =12 60 + 12 = 72 Lead into recording in column format, to reinforce place value and prepare children for formal written methods with larger values.  	I need to add ____ tens and ____ones. I start at ____. First I add_____tens. Then I add____ones.
Add three 1-digit numbers	 Combine to make 10 first if possible, or bridge 1o then add third digit  4+7+6 = 17 Put 4 and 6 together to make 10. Add on 7.	 Regroup and draw representation.  	 Combine the two numbers that make/ bridge ten then add on the third.	____ and ____ make 10. If I add____more, the total is ___ 10 +____ =____ So__ +___ + ___=____

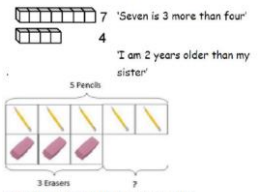
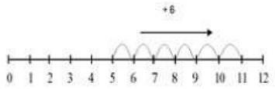
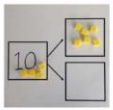
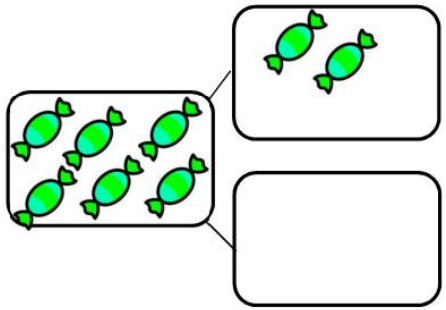
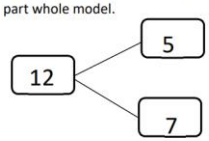
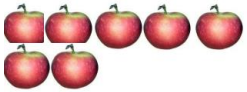
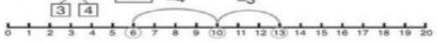
Estimate the answers to questions and use inverse operations to check answers	Use double sided counters to show the inverse of addition and subtraction 	Use numberlines to illustrate estimation and also to model the relationship between addition and subtraction 		If _____ is a part and _____ is a part, then _____ is the whole. If _____ is the whole and _____ is a part, then _____ is the other part. The inverse of _____ is _____

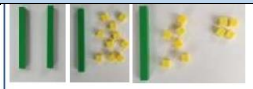
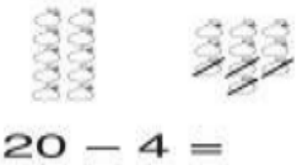
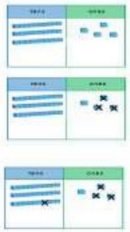
YEAR 3 ADDITION	NEW VOCABULARY: column addition formal written method regroup exchange Hundreds estimate expression equation			
Objective	**Concrete** tenframes rekenrek dienes/base ten place value counters place value grid	**Pictorial** Drawn representations for base ten Bar models Part whole models	**Abstract** Number sentence Missing number problems Column method	Sentence stems
Column Addition—no regrouping Add two or three 2 or 3digit numbers.	**Use Dienes or PV counters to add (up to Hundreds)** 	**Children to draw dienes or PV counters**  **35 + 32** **227+232**	2 2 3 + 1 1 4 3 3 7 Add the ones first, then the tens, then the hundreds.	_____ hundreds added to _____ hundreds is equal to _____ hundreds. I put _____ in the _____ column because … _____ ones plus _____ ones is equal to _____ ones. _____ tens plus _____ tens is equal to _____ tens. _____ hundreds plus _____ hundreds is equal to _____ hundreds. _____ hundreds, _____ tens and _____ ones is equal to _____
Column Addition with regrouping.	**Use dienes or PV counters**  	 367 + 294 661 11	20 + 5 40 + 8 60 + 13 = 73 Start by partitioning the numbers before formal column to show the exchange. 536 + 85 621 1 1	_____ tens + _____ tens = _____ tens If I have _____ tens, I can exchange them for _____ hundred and _____ tens. I have _____ hundreds, _____ tens and _____ ones, so altogether I have _____ In column addition, we start from the place value column that has the _____ value. The _____ is in the _____ column. It represents _____

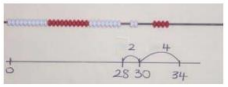
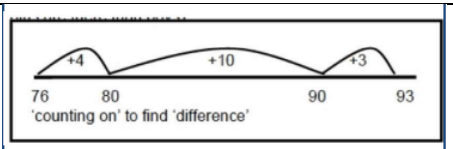
YEAR 4 -6 ADDITION	NEW VOCABULARY: y4 thousands 4 digit number operation Y5 ten thousands hundred thousands million tenths hundredths powers of ten place holder y6 ten million thousandths			
Objective	**Concrete** dienes/base ten place value counters place value grid	**Pictorial** Drawn representations for base ten Bar models Part whole models Drawn PV frames and counters	**Abstract** Number sentence (calculation) Missing number problems Column method	Sentence stems
Y4—add numbers with up to 4 digits	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.  **Use money to represent**	 Draw representations using place value grid.	 Continue from previous work to carry hundreds as well as tens. Relate to money and measures.	_____ ones added to _____ ones is equal to _____ ones. _____ plus _____ plus the 1 that I exchanged from the last column is equal to _____ I have _____ hundreds/tens/ones, so I do/do not need to make an exchange. In column addition, we start from the place value column that has the _____ value. The _____ is in the _____ column. It represents _____

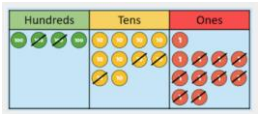
Y5—add numbers with more than 4 digits. Add decimals with 2 decimal places, including money	As year 4  Introduce decimal place value counters and model exchange for addition.	 	72.8 + 54.6 127.4 1 1  Insert zeros for place holders.  	In column addition, we start from the place value column that has the _____ value. The _____ is in the _____ column. It represents _____ I say ___ point ___ but I think ___ and ___ tenth(s). I say ___ point ___ ___ but I think ___ and ___ hundredths.
Add decimal numbers up to 3 decimal places	 		Insert zeros for place holders.  	_____ added to _____ is equal to _____ _____ subtract _____ is equal to _____ _____ tenths added to _____ tenths is equal to _____ tenths. I do/do not need to make an exchange because ...

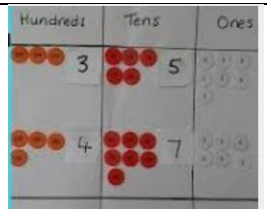
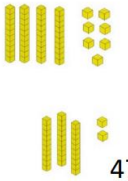
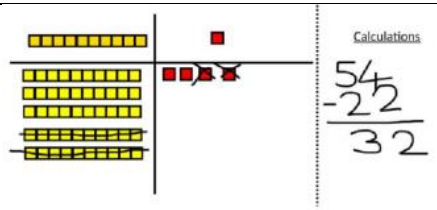
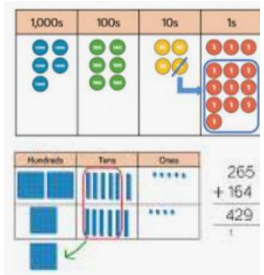
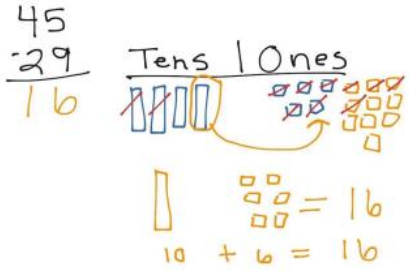
YEAR 1 SUBTRACTION	VOCABULARY: part whole taking away counting back find the difference bond to ten			
Objective	**Concrete (representation)** Multilink, counters, bead strings, tenframes rekenrek	**Pictorial (process)** Part whole model Bar model numberline	**Abstract** Number sentence	Sentence stems
Taking away ones	**Use physical objects to show how objects can be taken away** 	**Draw objects and cross out objects to show which have been taken away**  15 – 3 = 12	7—4 = 3 16—9 = 7 One less than….	AUGMENTATION: First there were _____ Then _____ were taken away. Now there are _____
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?	I need to start from _____ I need to make _____ jumps backwards. I land on _____ This means that _____ – _____ = _____

Find the difference	Compare objects and amounts  Lay objects to represent bar model.	Count on using a number line to find the difference.  	Hannah has12 sweets and her sister has 5. How many more does Hannah have than her sister.?	
Represent and use number bonds and related subtraction facts within 20 **Include subtracting zero** Part Part Whole model	 Link to addition. Use PPW model to model the inverse. If 10 is the whole and 6 is one of the arts, what s the other part? 10—6 = 4	 Use pictorial representations to show the part.	Move to using numbers within the part whole model.  Include missing number problems: 12 - ? = 5 7 = 12 - ? /	If the whole is _____ and _____ is a part, then the other part is _____ _____ minus _____ is _____ _____ – _____ = _____
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.  5—2 = 3	13 – 7 = 6  13—7 Jump back 3 first, then another 4. Use ten as the stopping point.  Draw pictures to represent	16—8 How many do we take off first to get to 10? How many left to take off? 8 | 2 10 = 8 + 2 10 = 2 + 8 10—2 = 8 10—8 = 2	First I need _____ to reach 10 Then I need _____ to reach ____ ___ subtract ____ = ____ ____and ___ is a bond to 10 10 is made up of ___and ___

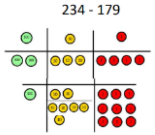
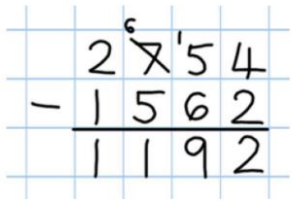
YEAR 2 SUBTRACTION	VOCABULARY: part whole taking away counting back find the difference Partitioning addend subtrahend minuend			
Objective	**Concrete (representation)** Multilink, counters, bead strings, tenframes rekenrek	**Pictorial (process)** Part whole model Bar model numberline	**Abstract** Number sentence	Sentence stems
Regroup a ten into ten ones	 Use a PV chart to show how to change a ten into ten ones, use the term 'take and make'	 20 — 4 =	20—4 = 16	To subtract _____ ones, I need to subtract 1 _____ times.
Partitioning to subtract without regrouping. 'Friendly numbers	34—13 = 21  Use Dienes to show how to partition the number when subtracting without regrouping.	Children draw representations of Dienes and cross off.  43—21 = 22	43—21 = 22	First I take _____ tens and then I take_____ ones. I have ____tens and _____ones left. I have____ left.

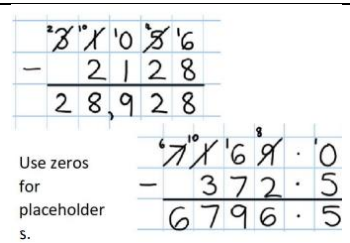
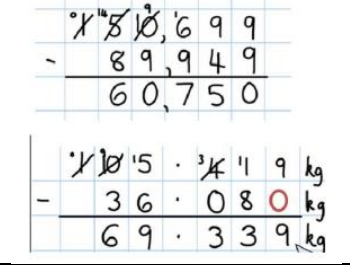
Make ten strategy Progression should be crossing one ten, crossing more than one ten, crossing the hundreds.	 34—28 Use a bead bar or bead strings to model counting to next ten and the rest.	 Use a number line to count on to next ten and then the rest.	93-76=17	I need to subtract _____ to get to 10 I can partition _____ into _____ and _____ I need to subtract _____ more. _____ less than _____ is _____

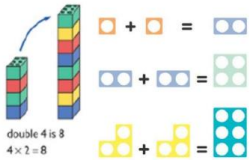
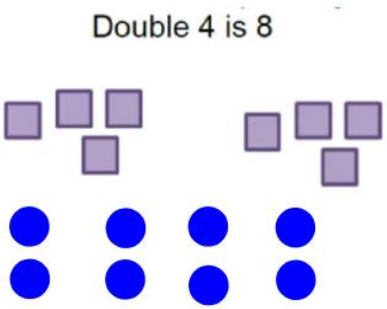
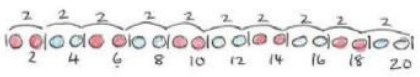
YEAR 3 SUBTRACTION	VOCABULARY: part whole taking away counting back find the difference Partitioning exchange			
Objective	**Concrete (representation)** Multilink, counters, bead strings, tenframes rekenrek	**Pictorial (process)** Part whole model Bar model numberline	**Abstract** Number sentence	Sentence stems
Subtract numbers mentally, including: three digit number - ones three digit number - tens three digit number	 **Use PV counters or dienes on a PV grid to make the number and remove ones or tens**	 **Draw the counters on a grid**	Vary the position of the answer and question. Expose children to missing number questions and vary the missing part of the calculation. 678 = ? - 1 688 – 10 = ? 678 = ? – 100	• When adding or subtracting 1s to or from a number, the digit in the _____ column always changes. • If I know 3 + 6 = 9, then I know that 123 + 6 = _____

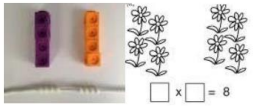
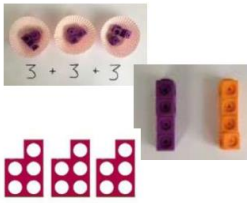
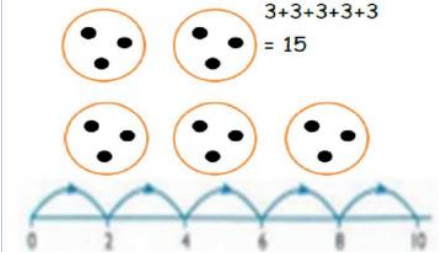
	 **Move to representing counters with digits**			
Column subtraction without regrouping (friendly numbers)	 47—32	 Draw representations to support understanding	47 − 24 = 23 40 + 7 − 20 + 4 20 + 3 Intermediate step may be needed to lead to clear subtraction understanding. 	• _____ ones/tens/hundreds minus _____ ones/tens/hundreds is equal to _____ ones/tens/hundreds. • Now there are _____ hundreds, _____ tens and _____ ones. The answer is _____ I put the minuend on top I start from the column with the smallest value. I subtract FROM the minuend
Column subtraction with regrouping	 Begin with base 10 or Numicon. Move to pv counters, modelling the exchange of a ten	 Children may draw base ten or PV counters and cross off.	 Begin by partitioning into pv columns  Then move to formal method.	• _____ ones subtract _____ ones is equal to _____ ones. • I will exchange 1 ten for _____ ones. • Now I have _____ hundreds, _____ tens and _____ ones. The answer is _____

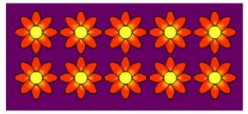
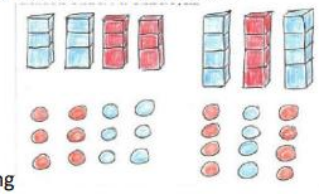
	into ten ones. Use the word exchange			

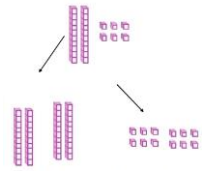
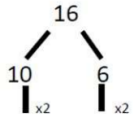
YEAR 4-6 SUBTRACTION	VOCABULARY: part whole taking away counting back find the difference Partitioning			
Objective	**Concrete (representation)** Multilink, counters, bead strings, tenframes rekenrek	**Pictorial (process)** Part whole model Bar model numberline	**Abstract** Number sentence	Sentence stems
Subtracting tens and ones **Year 4** subtract with up to 4 digits. Introduce decimal subtraction through context of money	Start representing the exchange using dienes first then move on to PV counters 	Children to draw pv counters and show their exchange—see Y3	 Use the phrase 'take and make' for exchange	• ____ tens subtract ____ tens is equal to ____ • I will exchange 1 hundred to make ____ tens. • Now there are ____ hundreds, ____ tens and ____ ones. The answer is ____ • ____ hundreds subtract ____ hundreds is equal to ____ • I will exchange 1 hundred for ____ tens, then 1 ten for ____ ones.

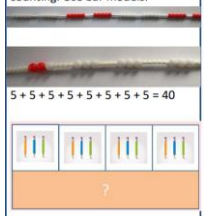
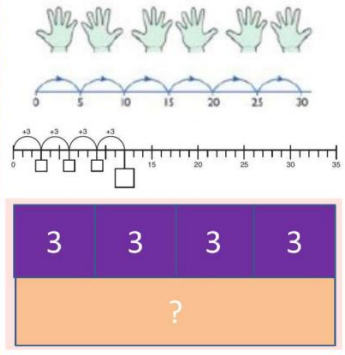
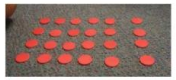
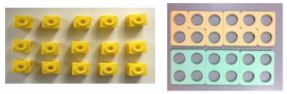
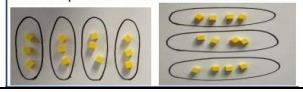
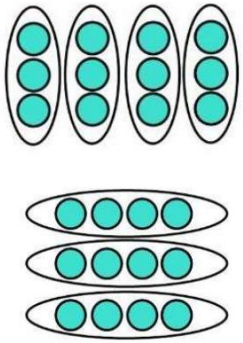
Year 5- Subtract with at least 4 digits, including money and measures. Subtract with decimal values, including mixtures of integers and decimals and aligning the decimal Up to 3 decimal places	As Year 4	Children to draw pv counters and show their exchange—see Y3		
Year 6—Subtract with increasingly large and more complex numbers and decimal values (up to 3 decimal place).	As Year 4	Children to draw pv counters and show their exchange—see Y3		

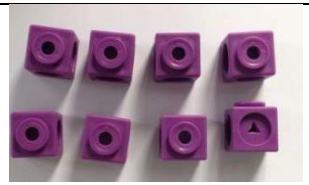
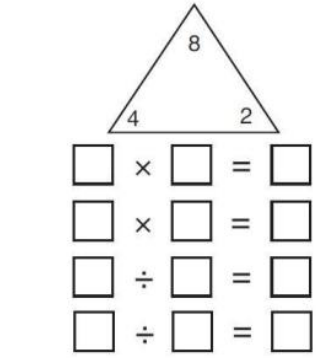
YEAR 1 MULTIPLICATION	Programme of Study specifies the following objectives, however it does not require the explicit teaching of the mathematical symbol of multiplication **multiplication division arrays multiply divide**			
Objective	**Concrete (representation)** Multilink, counters, bead strings, tenframes rekenrek	**Pictorial (process)** Part whole model Bar model numberline	**Abstract** Number sentence	Sentence stems
Doubling	Use practical activities using manipultives including cubes and Numicon to demonstrate doubling  	Draw pictures to show how to double numbers  	**'double 4 is 8'**	• Double _____ is _____ _____ + _____ = _____ • This is double _____ • _____ is/is not a double. I know this because ...
Counting in multiples (2s, 5s, 10s)	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 multiples of a number aloud. Write sequences with multiples of numbers. 2, 4, 6, 8, 10 5, 10, 15, 20, 25 , 30	• There are _____ in each pair. There are _____ pairs. There are _____ in total. • There are _____ equal groups of 2 There are _____ altogether.

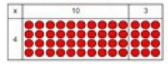
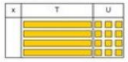
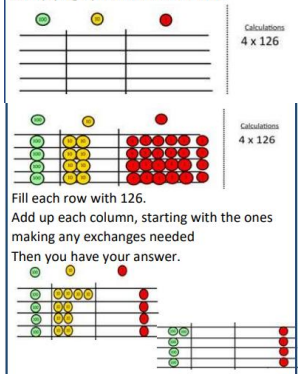
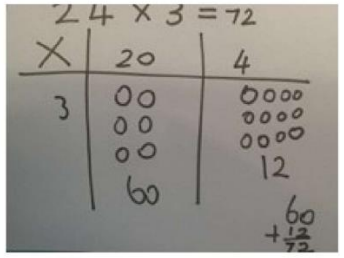
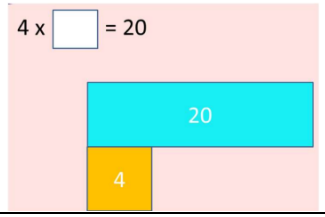
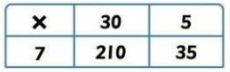
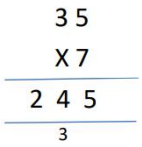
				• There are _____ groups of ten. There are _____ altogether. • There are _____ full ten frames. There are _____ in total. • There are _____ groups of 5 There are _____ altogether. • There are _____ 5s. There are _____ in total. • There are _____ 5s in 10
Making equal groups and counting the total	 Use manipulatives to create equal groups.	Draw  to show 2 x 3 = 6 Draw and make representations	2 x 4 = 8	• The groups are equal/not equal because … • There are _____ altogether. They can be put into equal groups of _____ There are _____ groups. • The _____ have/have not been shared equally. I know this because … • There are _____ altogether. They are shared equally between _____ groups. There are _____ in each group.
Repeated addition	 Use different objects to add equal groups	Use pictorial including number lines to solve prob There are 3 sweets in one bag. How many sweets are in 5 bags altogether? 	Write addition sentences to describe objects and pictures. 	• There are _____ equal groups. There are _____ in each group. There are _____ altogether. • There are _____ groups of _____ _____ + _____ + _____ + _____ + _____ = _____

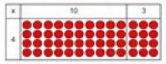
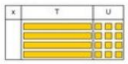
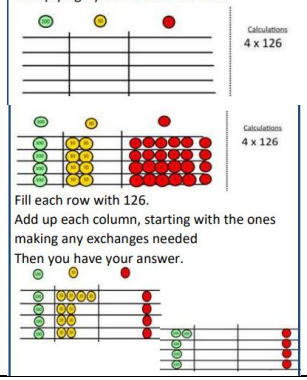
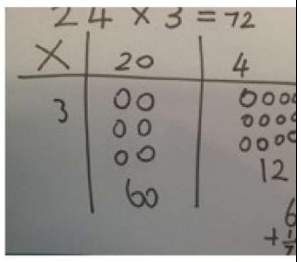
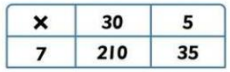
Understanding arrays	Use objects laid out in arrays to find the answers to 2 lots 5, 3 lots of 2 etc. 	Draw representations of arrays to show understanding 	2 x 5 = 10 2 x 3 = 6	• There are _____ rows. There are _____ in a row. There are _____ in total. • There are _____ columns. There are _____ in a column. There are _____ altogether.

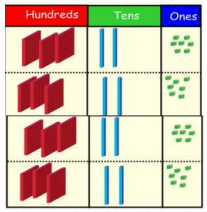
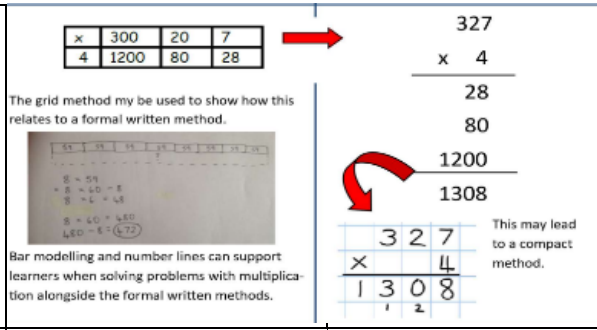
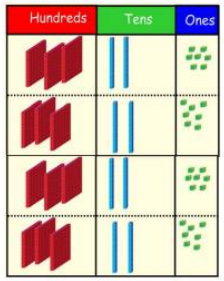
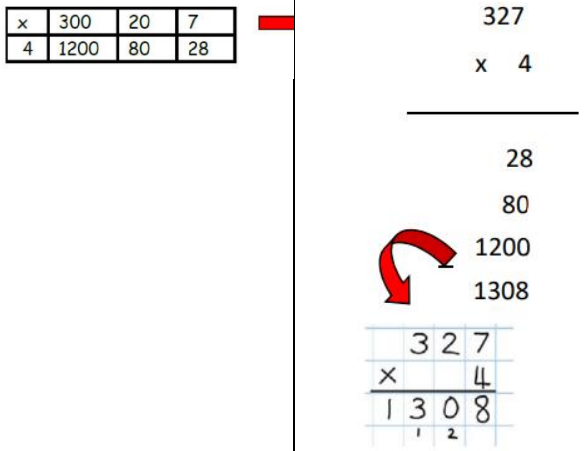
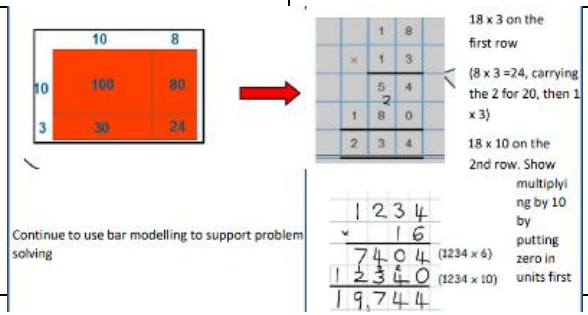
YEAR 2 MULTIPLICATION	Children should be able to recall and use multiplication and division facts for the 2, 5 and 10 times times tables Children are introduced to the X symbol for multiplication Repeated addition times tables multiplication tables commutative • There are 3 equal groups with _____ in each group. _____ + _____ + _____ = _____ _____ × _____ = _____ • _____ × _____ = _____ • _____ multiplied by _____ is equal to _____ of double _____ • _____ half of _____ = _____			
Objective	**Concrete (representation)** Multilink, counters, bead strings, tenframes rekenrek	**Pictorial (process)** Part whole model Bar model numberline	**Abstract** Number sentence	Sentence stems
Doubling	Model doubling using dienes and PV counters.  40 + 12 = 52	Draw pictures and representations to show how to double numbers	Partition a number and then double each part before recombining it back together.  16 10 x2 6 x2 20 + 12 = 32	• Double _____ is _____ • Half of _____ is _____ • Double _____ is _____, so double _____ is _____ • Half of _____ is _____, so half of _____ is _____

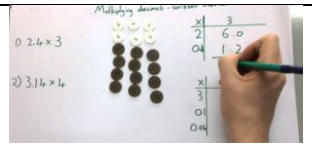
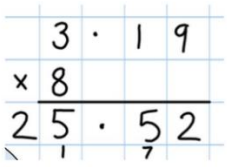
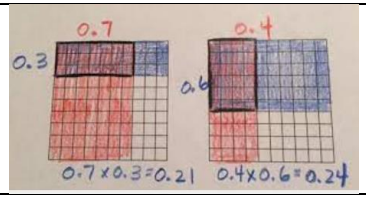
Counting in multiples of 2, 3, 4, 5, 10 from 0 (repeated addition)	Count the groups as children are skip counting, children may use their fingers as they are skip counting. Use bar models.  	Number lines, counting sticks and bar models should be used to show representation of counting in multiples.  	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 $4 \times 3 = \square$	• _____ × 2 is the same as _____ lots of 2 • _____ multiplied by 2 is equal to _____ • I know that _____ × 2 = _____, so I can add/subtract 2 to work out _____ × 2 • There are 3 equal groups with _____ in each group. There are 3 groups of _____ _____ + _____ + _____ = _____ • There are _____ equal groups with _____ in each group. There are _____ groups of _____ There are _____ altogether.
Multiplication is commutative	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 × 4 12 = 4 × 3  5 + 5 + 5 = 15 3 + 3 + 3 + 3 + 3 = 15 5 x 3 = 15 3 x 5 = 15	_____ x_____ = _____ So ___ x_____ is _____ 4+4+4 = 12 So 3+3+3+3 = 12

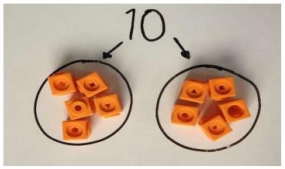
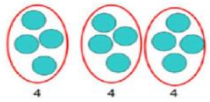
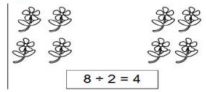
Using the Inverse This should be taught alongside division, so pupils learn how they work alongside each other.			2 x 4 = 8 4 x 2 = 8 8 ÷ 2 = 4 8 ÷ 4 = 2 8 = 2 x 4 8 = 4 x 2 2 = 8 ÷ 4 4 = 8÷ 2 Show all 8 related fact family sentences	• _____ × _____ ones is equal to _____ ones, so _____ × _____ tens is equal to _____ tens. • _____ ÷ _____ is equal to _____, so _____ tens ÷ _____ is equal to _____ tens.

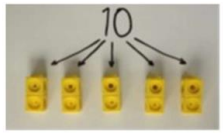
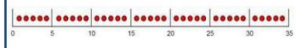
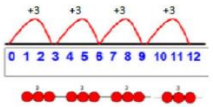
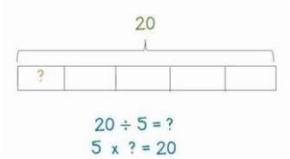
YEAR 3 MULTIPLICATION	Children should be able to recall and use multiplication facts for the 3,4, and 8 times tables Derived facts missing number problems product			
Objective	**Concrete (representation)** Multilink, counters, bead strings, tenframes rekenrek	**Pictorial (process)** Part whole model Bar model numberline	**Abstract** Number sentence	Sentence stems
Grid method, progressing to the formal method Multiply 2 digit numbers by 1 digit numbers	Show the links with arrays to first introduce the grid method.  4 rows of 10 4 rows of 3 Move onto base ten 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 126. Add up each column, starting with the ones making any exchanges needed Then you have your answer.	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.  Bar model are used to explore missing numbers  4 x ☐ = 20 20 4	Start with multiplying by one digit numbers and showing the clear addition alongside the grid.  210 + 35 = 245 Move forward to the formal written method: 	_____ is partitioned into ____ and ____ First I multiply _____ by_____ Then I add up the products
Solve problems, including missing number problems, integer scaling problems,	Using paper folded into 3 to demonstrate 3 times as long/ three times as high		Three times as high, eight times as long ? x 5 = 20 20 ÷ ? = 5 3 hats and 4 coats, how many different outfits?	• _____ is _____ times the length of _____ • _____ multiplied by _____ is equal to _____ • _____ times the size of _____ is _____

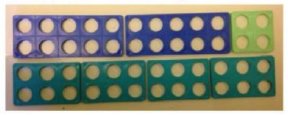
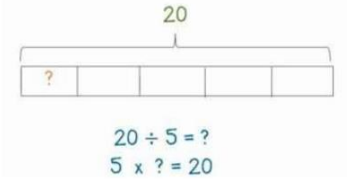
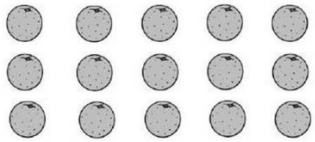
YEAR 4 MULTIPLICATION	Factors factor pairs			
Objective	**Concrete (representation)** Multilink, counters, bead strings, tenframes rekenrek	**Pictorial (process)** Part whole model Bar model numberline	**Abstract** Number sentence	Sentence stems
Grid method recap from year 3 for 2 digits x 1 digit Move to multiplying 3 digit numbers by 1 digit. (year 4 ex-pectation)	Show the links with arrays to first introduce the grid method.  4 rows of 10 4 rows of 3 Move onto base ten 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  Calculations 4 x 126 Calculations 4 x 126 Fill each row with 126. Add up each column, starting with the ones making any exchanges needed Then you have your answer.	Children can represent their work with pla value counters in a way that they understa They can draw the counters using colours t show different amounts or just use the circ the different columns to show their thinkir shown below.  24 x 3 = 72 x 20 4 3 60 12	Start with multiplying by one digit numbers and showing the clear addition alongside the grid.  × 30 5 7 210 35 210 + 35 = 245 Move forward to the formal written method: 35 X 7 245 3	• _____ partitioned into tens and ones is _____ and • _____ × _____ = _____ tens × _____ + _____ ones = _____ tens + _____ ones = _____ • To multiply a 2-digit number by _____, you m the _____ by _____ and the _____ by _____ • _____ tens multiplied by _____ plus the ten i equal to _____ tens. • _____ ones × _____ = _____ ones _____ tens × _____ = _____ tens _____ hundreds × _____ = _____ hundre • _____ tens/hundreds multiplied by _____ hundred from the exchange is equal to _

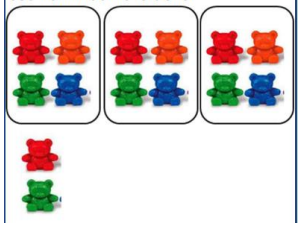
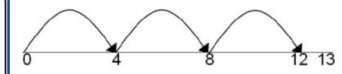
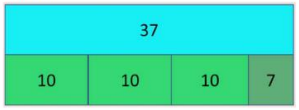
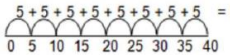
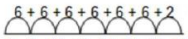
Column multiplication	Children can continue to be supported by place value counters at the stage of multiplication. This initially done where there is no regrouping. 321 x 2 = 642  It is important at this stage that they always multiply the ones first. The corresponding long multiplication is modelled alongside	 	
Column Multiplication for 3 and 4 digits x 1 digit.	 It is important at this stage that they always Multiply the ones first. 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	 	
Column Multiplication	Manipulatives may still be used with the corresponding long multiplication modelled alongside.	 	

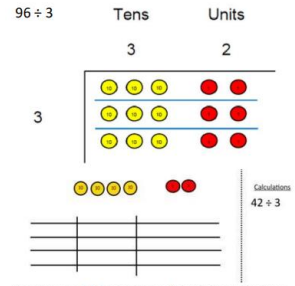
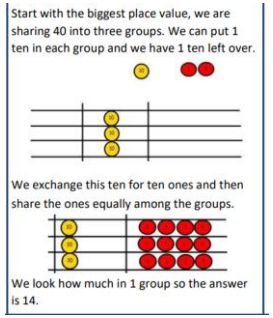
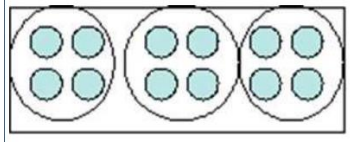
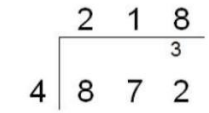
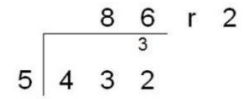
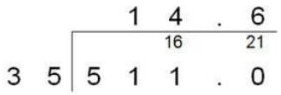
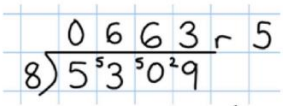
Multiplying decimals up to 2 decimal places by a single digit			Remind children that the single digit belongs in the units column. Line up the decimal points in the question and the answer. 	
Multiplying decimals by a decimal				

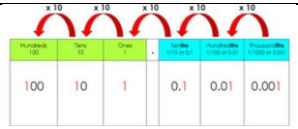
YEAR 1 DIVISION				
Objective	**Concrete (representation)** Multilink, counters, bead strings, tenframes rekenrek	**Pictorial (process)** Part whole model Bar model numberline	**Abstract** Number sentence	Sentence stems
Division as sharing	   I have 10 cubes, can you share them equally in 2 groups?	Children use pictures or shapes to share quantities.  8 shared between 2 is 4 Sharing:  12 shared between 3 is 4	12 shared between 3 is 4	• The _____ have/have not been shared equally. I know this because … • There are _____ altogether. They are shared equally between _____ groups. There are _____ in each group.
		Children use pictures or shapes to share quantities.  Children use bar modelling to show and support understanding.  12 ÷ 4 = 3		

Division as grouping	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.  	28 ÷ 7 = 4 Divide 28 into 7 groups. How many are in each group?	• The groups are equal/not equal because … • There are _____ altogether. They can be put into equal groups of _____ There are _____ groups.

YEAR 2 DIVISION				
Objective	**Concrete (representation)** Multilink, counters, bead strings, tenframes rekenrek	**Pictorial (process)** Part whole model Bar model numberline	**Abstract** Number sentence	Sentence stems
Division as 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. 	How many groups of 6 in 24? 24 ÷ 6 = 4	• There are _____ altogether. I have put them into equal groups of _____ There are _____ groups. • _____ ÷ _____ = _____
Division as arrays	 Link division to multiplication by creating an array and thinking about the number sentences that can be created. Eg 15 ÷ 3 = 5 5 x 3 = 15 15 ÷ 5 = 3 3 x 5 = 15	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	• There are _____ rows and _____ columns. • In this array, I can see _____ × _____ and _____ × _____ • There are _____ × _____ = _____ altogether.

YEAR 3 DIVISION	Remainder			
Objective	**Concrete (representation)** Multilink, counters, bead strings, tenframes rekenrek	**Pictorial (process)** Part whole model Bar model numberline	**Abstract** Number sentence	Sentence stems
Division as sharing	14 ÷ 3 = Divide objects between groups and see how much is left over 	Jump forward in equal jumps on a number line then see how many more you need to jump to find a remainder.  0 4 8 12 13 Draw dots and group them to divide an amount and clearly show a remainder.  remainder 2 Use bar models to show division with remainders.  37 10 10 10 7 remainder: 5s in 40?"  5 + 5 + 5 + 5 + 5 + 5 + 5 + 5 = 8 fi 0 5 10 15 20 25 30 35 40 mainder:  6 + 6 + 6 + 6 + 6 + 6 + 2 = 6 sixes with 0 6 12 18 24 30 36 38 rs, when it becomes inefficient to count in single mu orded using known facts.	Complete written divisions and show the remainder using r. 29 ÷ 8 = 3 REMAINDER 5 ↑ dividend ↑ divisor ↑ quotient ↑ remainder	• _____ partitioned into tens and ones is _____ tens and _____ ones. • _____ divided by _____ is equal to _____ • _____ can be partitioned into _____ and _____, as these numbers are both multiples of _____ • _____ divided by _____ is equal to _____ • There are _____ groups of _____ There are _____ remaining. So _____ ÷ _____ = _____ r_____

YEAR 4-6 DIVISION	Dividend product quotient divisor square numbers cube numbers prime numbers composite numbers			
Objective	**Concrete (representation)** Multilink, counters, bead strings, tenframes rekenrek	**Pictorial (process)** Part whole model Bar model numberline	**Abstract** Number sentence	Sentence stems
Divide at least 3 digit numbers by 1 digit. Short Division	 Use place value counters to divide using the bus stop method alongside 42 ÷ 3= 	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.	Begin with divisions that divide equally with no remainder.  Move onto divisions with a remainder.  Finally move into decimal places to divide the total accurately.  	• _____ tens divided by _____ = _____ tens each • _____ ones divided by _____ = _____ ones each • I cannot share all of the tens equally, so I need to … • To use the formal method of division, I start with the digit on the _____ and work from _____ to _____ • There are _____ groups of _____ thousands/hundreds/tens/ ones in _____ thousands/hundreds/tens/ones. • _____ hundreds divided by _____ is equal to _____ hundreds with a remainder of _____ • Exchange the remainder, then _____ tens divided by _____ is equal to _____ tens with a remainder of _____ • Exchange the remainder, then _____ ones divided by _____ is equal to _____ ones. • _____ ones divided by _____ = _____ ones remainder _____ • When dividing by _____, the greatest possible remainder is _____

Dividing by 10 100	 Using a place value chart and post it notes to move digits along (This is useful because you can stick the post it notes together to model how they move without adding or losing zeros along the way)	Chn to draw own PV chart or use squares in their book to move digits	(see sentence stems) Missing number problems eg: _____ ÷ 100 = 246 Or missing operation 845_____= 84,500	• _____ ÷ 10 = _____ • _____ = _____ ÷ 10 • _____ is one-tenth the size of _____ • _____ ÷ 100 = _____ ÷ 10 ÷ 10 = _____ ÷ 10 = _____ • _____ ÷ 100 = _____, so _____ = _____ ÷ 100 • _____ is one-hundredth the size of _____ • _____ divided by 10/100/1,000 is equal to _____ • _____ is one-tenth/one-hundredth/one-thousandth the size of _____ • There were _____ tens/hundreds. Now there are _____ ones/tens.
Long division			1 - 24 2 - 48 3 - 72 4 - 96 5 - 120 6 - 144 7 - 168 8 - 192 9 - 216 543 24|13032 -120↓ 103 -96↓ 72 -72	• _____ hundreds divided by _____ is equal to _____ hundreds with a remainder of _____ The remainder is exchanged into _____ tens. • _____ tens divided by _____ is equal to _____ with a remainder of _____ The remainder is exchanged into _____ ones. OR • _____ cannot be divided by _____, so there is a _____ of _____