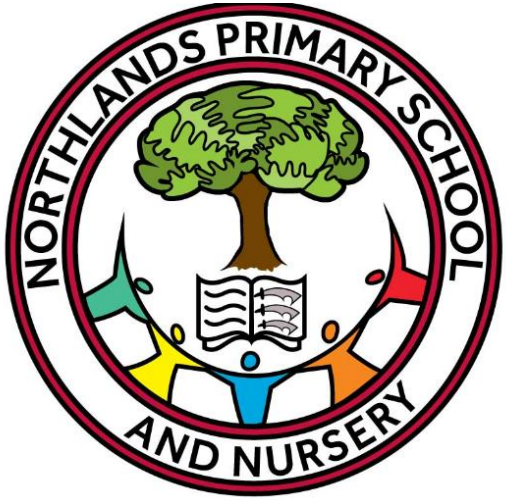
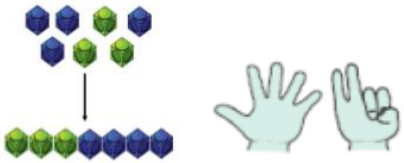
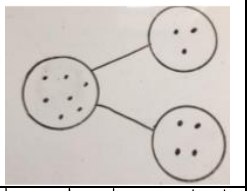
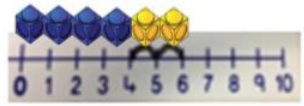
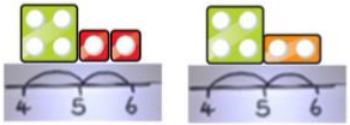
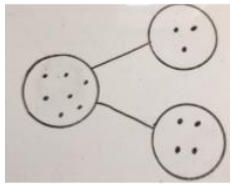
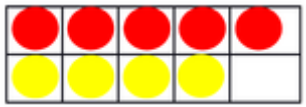
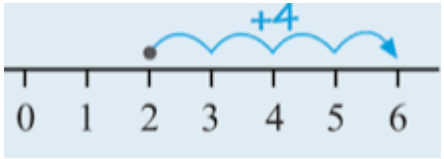
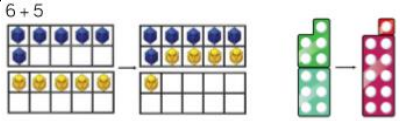
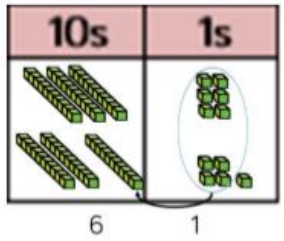
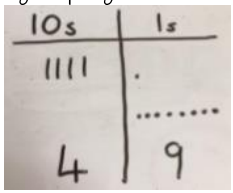
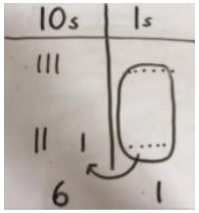
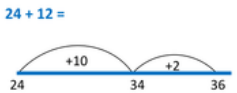
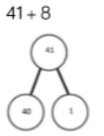
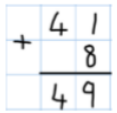
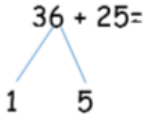
Northlands Primary School and Nursery

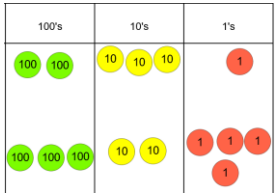
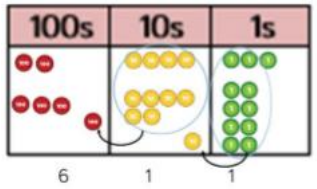
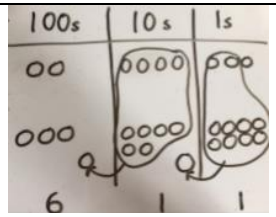
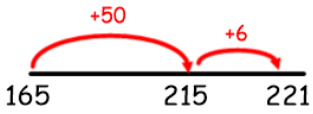
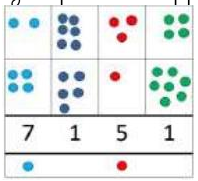
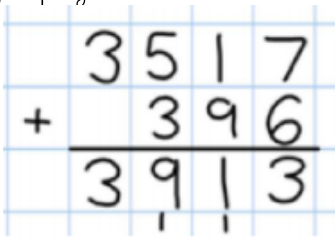
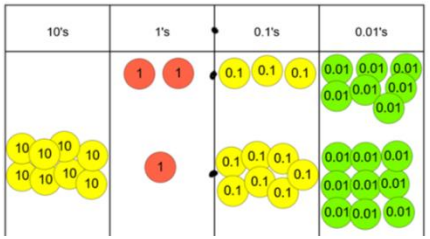
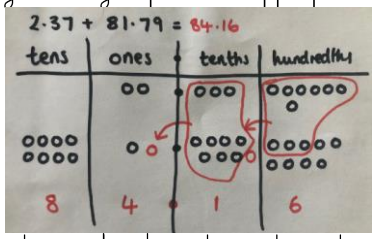
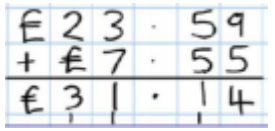
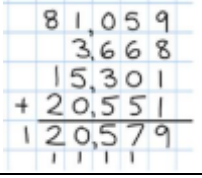
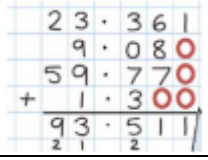


Calculation Policy

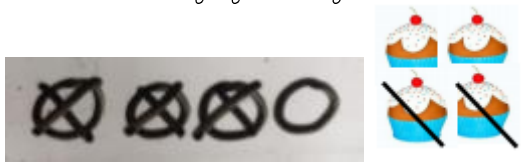
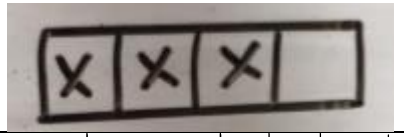
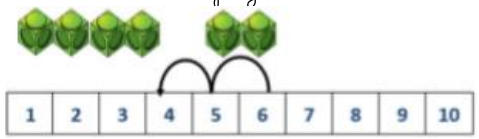
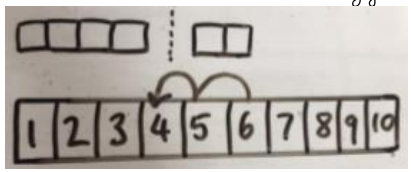
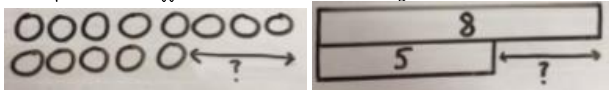
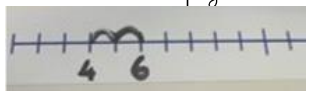
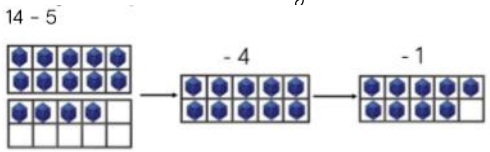
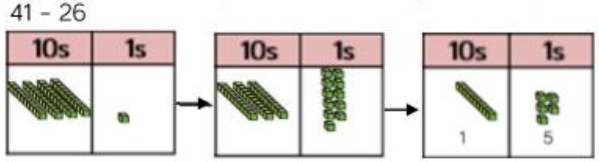
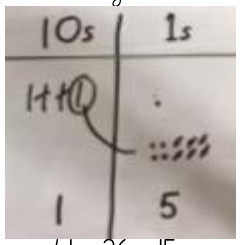
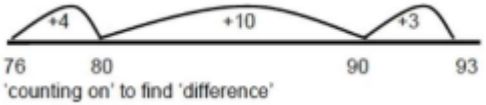
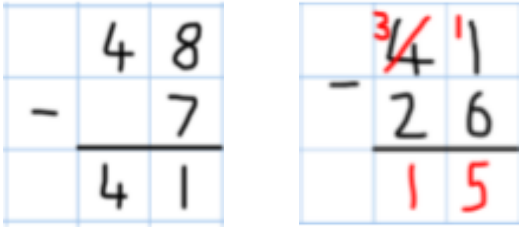
Northlands Primary School – Calculation Policy

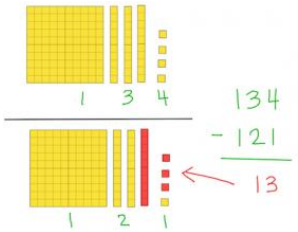
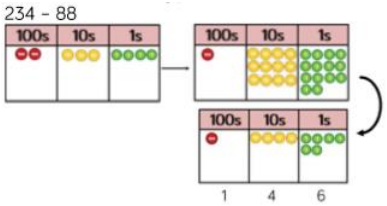
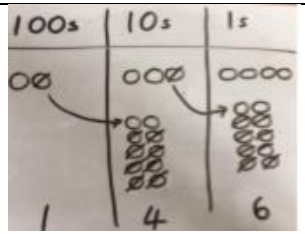
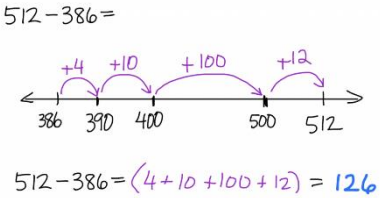
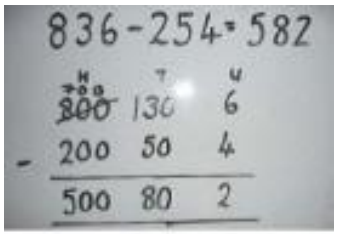
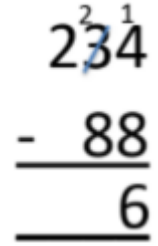
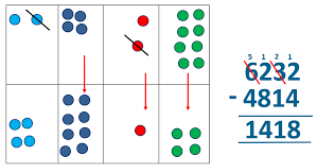
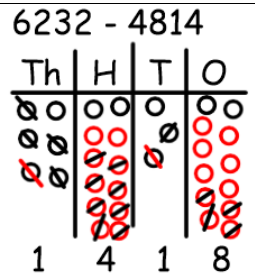
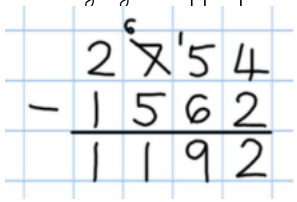
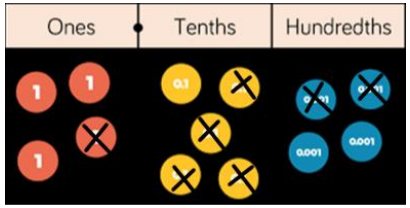
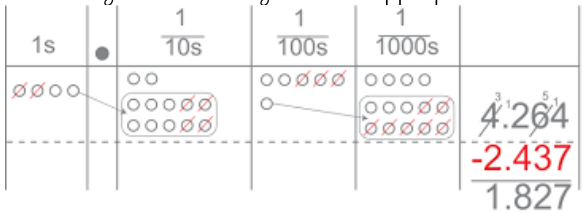
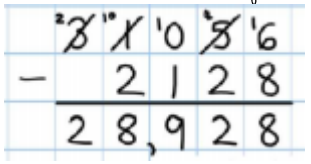
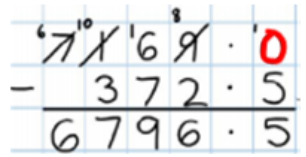
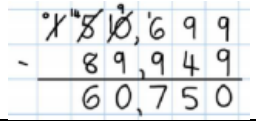
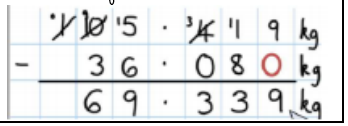
Addition

Year	Concrete	Pictorial	Abstract
R	Counting objects/fingers – combining two parts to make a whole 	Counting pictures – begin to match number of objects to written numeral 	Recognise numbers in a simple addition sentence and then solve practically 2 + 3 = 5  3 + 4 = 7 
1	Counting on using numberlines with cubes/numicon  	Drawing part-whole models and ten frames to combine two parts – using number bonds to 20  	Count on using an abstract marked number line – start at the largest number and add on 
2	Regroup tens using ten frames or numicon 6 + 5  Add TO + O or TO + TO using Base 10 or place value counters – use understanding of place value, partitioning and regrouping tens 36 + 25 	Add TO + O or TO + TO by drawing Base 10 in a place value chart – regrouping tens where necessary. 41 + 8 =  36 + 25 = 	Move to more formal methods – use partitioning before combining tens and ones if needed, use partitioning to add chunks on numberline   1 + 8 = 9 40 + 9 = 49  36 + 25 =  30 + 20 = 50 5 + 5 = 10 50 + 10 + 1 = 61 Formal method: 36 +25 61 1

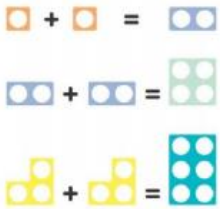
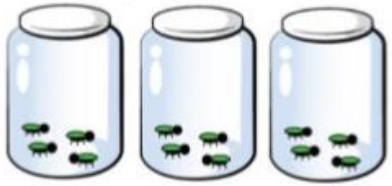
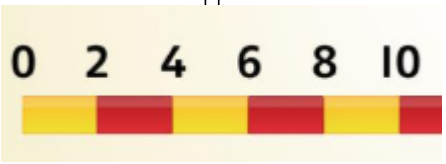
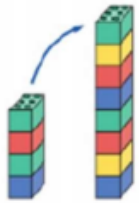
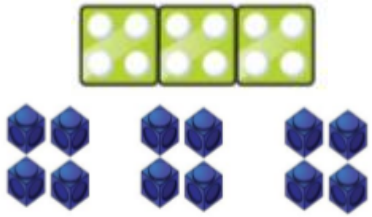
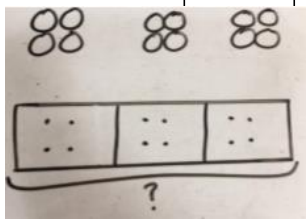
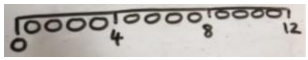
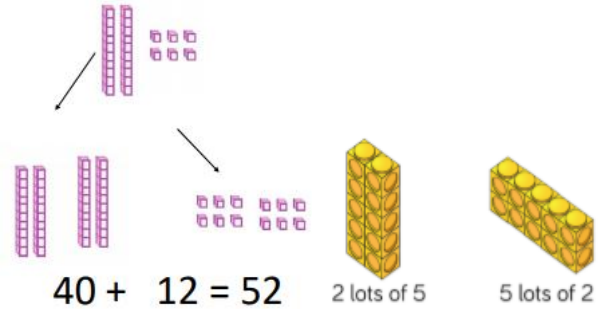
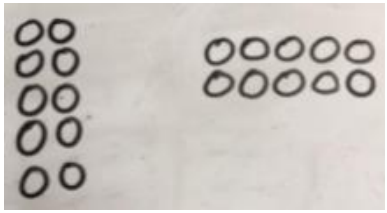
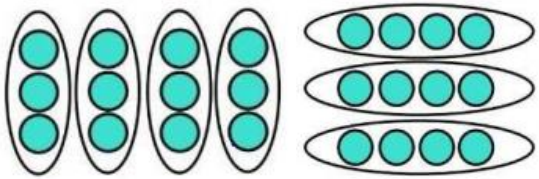
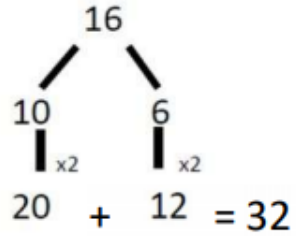
3	Add numbers with up to three digits using Base 10 or place value counters – begin with no regrouping and work towards regrouping ones and then regrouping tens 231 + 324  243 + 368 	Add numbers with up to three digits drawing Base 10 or place value counters – circle to regroup tens and ones  Use empty number lines to support addition by partitioning: 165 + 56 = 221 	Add numbers with up to three digits using formal column method – use partitioning if needed to start with when regrouping 231 + 324 = 555 200 + 40 + 3 300 + 60 + 8 500 + 100 + 11 =611 243 + 368 = 611 1 1
4	Add numbers with up to 4 digits (including those with one decimal place) using Base 10 or place value counters – include examples where different columns need regrouping  	Add numbers with up to 4 digits (including those with one decimal place) drawing place value counters in a grid – regroup where appropriate  Use empty number lines to continue to support addition by partitioning if needed	Add numbers with up to 4 digits (including those with one decimal place) using formal column method – regrouping underneath next column 
5	Add numbers with more than 4 digits and up to 2 decimal places using Base 10 or place value counters – include examples where different columns need regrouping 2.37 + 81.79 	Add numbers with more than 4 digits and up to 2 decimal places by drawing place value counters in a grid – regroup where appropriate  Use empty number lines to continue to support addition by partitioning if needed	Add numbers with more than 4 digits and up to 2 decimal places using formal column method – regroup underneath next column, line up decimal point and add place holder zero in decimals if needed and use in context of money and measures 4.8 + 4.26 = 9.06  4.80 +4.26 9.06
6	As Year 5 Add whole numbers and decimals in a range of contexts	As Year 5 Add whole numbers and decimals in a range of contexts	Add whole numbers and decimals using formal column method in a range of contexts - regroup underneath next column, line up decimal point and add place holder zero in decimals if needed  

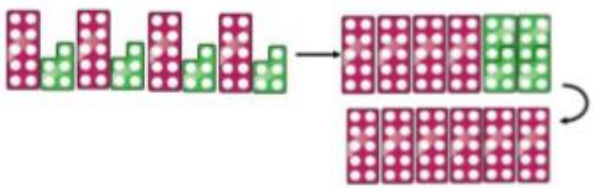
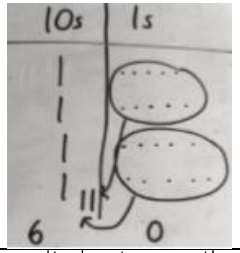
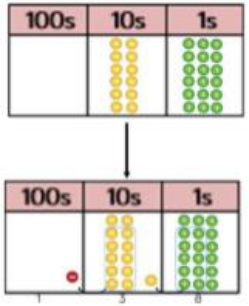
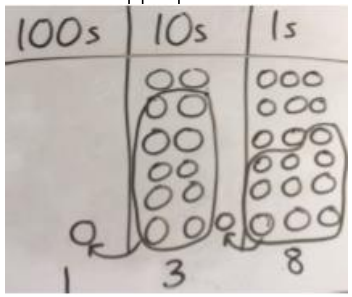
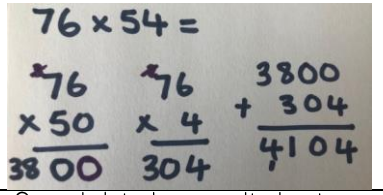
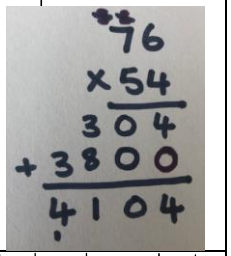
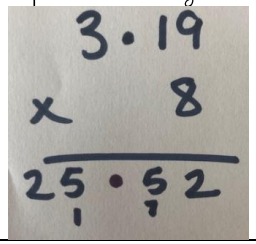
Subtraction

Year	Concrete	Pictorial	Abstract
R	Physically taking away objects – use a variety of resources to remove from the whole 	Cross out drawn objects – show what is being taken away by crossing out 	Recognise numbers in a simple subtraction sentence and then solve practically 4 - 3 = 
1	Counting back using numberlines with cubes/numicon or fingers  Find the difference between two sets of objects 	Counting back on a marked numberline using jumps  Represent difference with drawings or bar models 	Put larger number in your head and count back or count back on an empty number line  Put 13 in your head, count back 4. What number are you at?  Use part-whole models to find difference
2	Make 10 strategy – partition number being subtracted to use number bond knowledge using ten frames or bead strings  Subtract TO - O or TO - TO using Base 10 or place value counters – use understanding of place value, partitioning and exchanging tens – make larger number and take smaller away 	Make 10 strategy – move to the nearest ten first and take off what's left using marked number line  Subtract TO O or TO - TO by drawing Base 10 or place value counters in a place value chart – exchanging tens where necessary.  43—21 = 22  41 - 26 = 15	Counting back or counting on to find difference in chunks on an empty number line 93 - 76 = 17  Moving to formal column method subtraction – begin with no exchanging and then exchanging ten for ones 

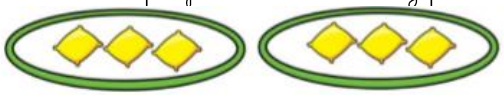
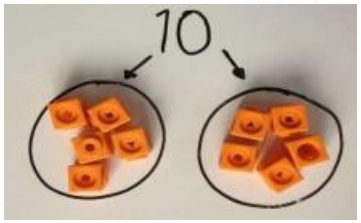
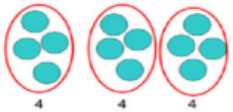
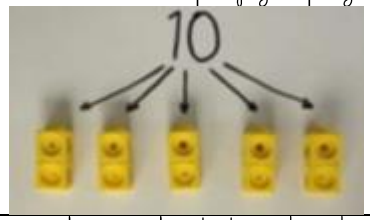
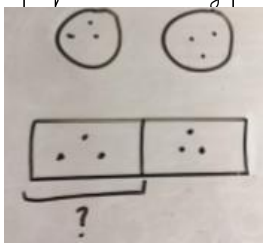
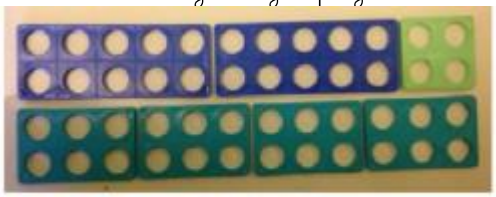
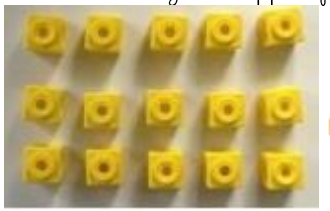
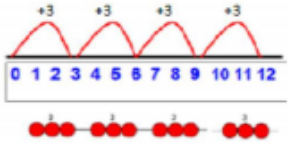
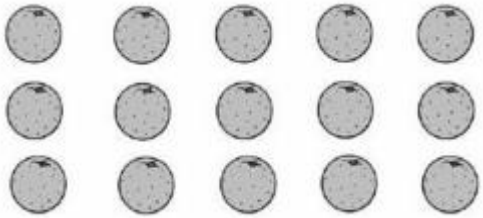
3	Subtract numbers with up to three digits using Base 10 or place value counters – begin with no regrouping and work towards exchanging tens and then exchanging hundreds   	Subtract numbers with up to three digits drawing Base 10 or place value counters – exchange tens and hundreds as appropriate  Use empty number lines to support subtraction counting on:  	Subtract numbers with up to three digits using formal column method – begin with partitioning if needed  
4	Subtract numbers with up to 4 digits (including those with one decimal place) using Base 10 or place value counters – include examples where different columns need exchanging  	Subtract numbers with up to 4 digits (including those with one decimal place) drawing place value counters in a grid – exchange where appropriate  Use empty number lines to continue to support subtraction by counting on if needed	Subtract numbers with up to 4 digits (including those with one decimal place) using formal column method – exchanging as appropriate 
5	Subtract numbers with more than 4 digits and up to 2 decimal places using Base 10 or place value counters – include examples where different columns need exchanging 4.54 – 1.42 = 3.12  	Subtract numbers with more than 4 digits and up to 2 decimal places by drawing place value counters in a grid – exchange where appropriate  Use empty number lines to continue to support addition by partitioning if needed	Subtract numbers with more than 4 digits and up to 2 decimal places using formal column method – exchange from next column, line up decimal point and add place holder zero in decimals if needed and use in context of money and measures  
6	As Year 5 Subtract whole numbers and decimals in a range of contexts	Subtract whole numbers and decimals in a range of contexts	Subtract whole numbers and decimals using formal column method in a range of contexts – exchange from next column, line up decimal point and add place holder zero in decimals if needed  

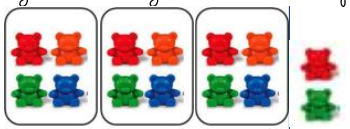
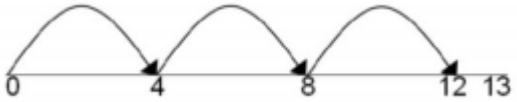
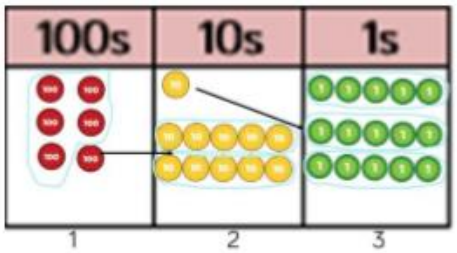
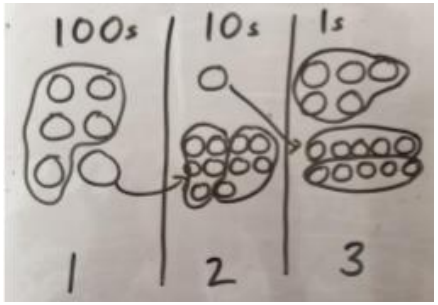
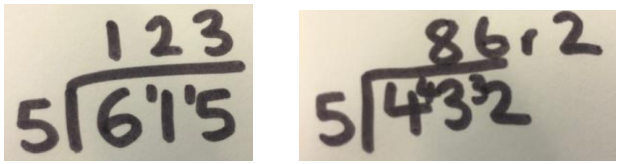
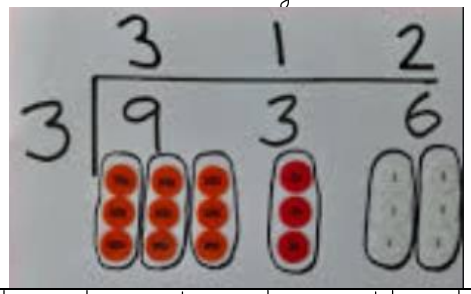
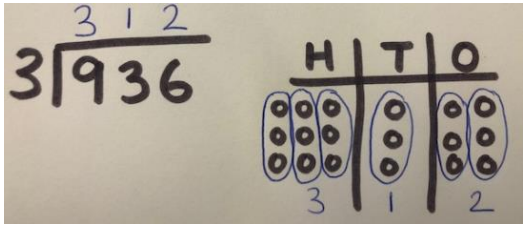
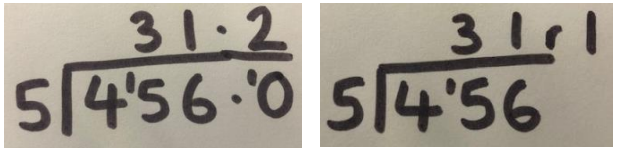
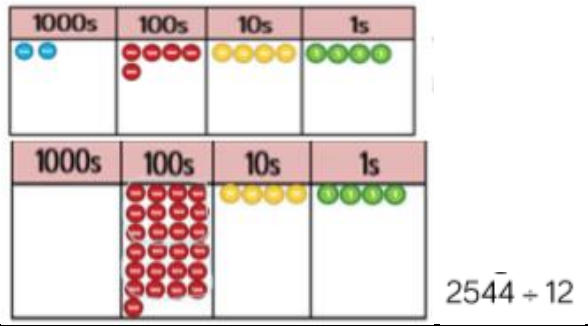
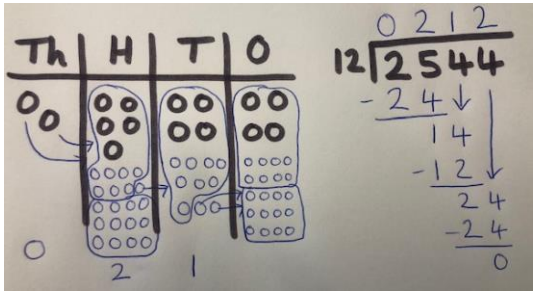
Multiplication

Year	Concrete	Pictorial	Abstract
R	Introduce doubling with concrete objects. 	Show pictures in groups to count how many there are altogether. 	Begin to count in 2s using counting sticks or objects to support. 
1	Use grouping of concrete objects for repeated addition and doubling up to 10   3 x 4 = 4 + 4 + 4	Draw groups, use bar models or number lines to represent repeated addition  	Begin to write simple multiplication and repeated addition calculations using concrete and pictorial representations to support 3 × 4 = 12 4 + 4 + 4 = 12
2	Use concrete apparatus to partition for doubling and show arrays to support repeated addition and showing commutativity 	Draw arrays to multiply and show commutativity  	Partition numbers to double and solve multiplication and repeated addition calculations  10 = 2 × 5 5 × 2 = 10 2 + 2 + 2 + 2 + 2 = 10 10 = 5 + 5

3	Partition two-digit numbers to multiply using numicon, base 10 or place value counters 	Partition two-digit numbers to multiply using pictorial representations or a number line 	Partition two-digit numbers to multiply by showing two calculations and adding and moving towards short multiplication method 3 × 23 20 3 3 × 20 = 60 3 × 3 = 9 60 + 9 = 69 23 × 3 69
4	Represent short multiplication method in place value chart with place value counters or base 10 6 x 23 	Represent short multiplication method pictorially by drawing place value chart and regrouping as appropriate 	Formal column short multiplication method 23 × 6 138 1 1
5	As Year 4 Represent multiplication method with manipulatives if numbers are manageable	As Year 4 Represent multiplication method with pictorial representations if numbers are manageable	Move towards long multiplication method – partition into two as a precursor to more compact method  
6	As Year 4 Represent multiplication method with manipulatives if numbers are manageable	As Year 4 Represent multiplication method with pictorial representations if numbers are manageable	Consolidate long multiplication method and use short method for multiplying decimals ensuring decimal point is place correctly in answer 

Division

Year	Concrete	Pictorial	Abstract
R	Introduce concept of division as sharing practically  	Share quantities using pictures or shapes  8 shared between 2 is 4  12 shared between 3 is 4	Verbally discussing how objects have been shared after concrete or pictorial representation 10 shared between 2 is 5
1	Division as sharing continued from Reception and introduce concept of grouping 	Share and group quantities using picture or shapes 	Begin to represent sharing using a simple division calculation based on concrete and pictorial representations 12 ÷ 3 = 4
2	Use counters, cubes or objects to aid understanding of sharing and grouping  24 divided into groups of 6 = 4 Use arrays to support finding division facts  Eg 15 ÷ 3 = 5 5 x 3 = 15 15 ÷ 5 = 3 3 x 5 = 15	Use a numberline to show grouping  12 ÷ 3 = 4 Draw arrays to support finding division facts 	Represent simple division calculations How many groups of 6 in 24? 24 ÷ 6 = 4 Find fact families within times tables = use multiplication facts and find the inverse 4 x 7 = 28 28 ÷ 7 = 4 28 ÷ 4 = 7 28 = 7 x 4 28 = 4 x 7 4 = 28 ÷ 7 7 = 28 ÷ 4

3	Begin to understand remainders by dividing objects by grouping and seeing how much is left over  Begin to use place value counters to show short division (see Year 4 example)	Jump forward on a numberline or draw groups of dots to clearly show a remainder  Begin to draw place value counters to show short division (see Year 4 example)	Complete written divisions within times table knowledge and show the remainder using r  Begin to use short division method for calculations that divide equally with no remainder (see Year 4)
4	Use place value counters and represent short division method alongside 615 ÷ 5 	Draw place value counters to represent short division method 	Use short division method and show remainders using r 
5	Use place value counters and represent short division method alongside 	Draw place value counters to represent short division method 	Use short division method and show remainders using r or continue into decimal places if necessary 
6	Use place value counters and represent long division alongside 	Draw place value counters to represent long division method 	Use long division method to divide by 2-digit numbers and express remainders as r or decimal where appropriate