Askern Moss Road Infant Academy and Askern Littlemoor Infant Academy

Maths Calculation Policy

VERSION	AUTHOR	SUMMARY OF CHANGES	DATE PUBLISHED	DATE OF REVIEW
1.0	CAT	NEW POLICY	April 2023	April 2025

Contents

1. THE AIMS OF THIS POLICY

1.1 The aim of this policy is to ensure all children leave our school with a secure understanding of the four operations and can confidently use both written and mental calculation strategies in a range of contexts. It aims to ensure consistent strategies, models and images are used across the school to embed and deepen children's learning and understanding of mathematical concepts.

2. HOW SHOULD THIS POLICY BE USED?

2.1 This policy has been designed to support the teaching and planning of mathematics in our school. The policy only details the strategies, and teachers must plan opportunities for pupils to apply these the White Rose small steps for learning; for example, when solving problems, or where opportunities emerge elsewhere in the curriculum. The examples and illustrations are not exhaustive but provide and overall picture of what the mathematics in our school should look like. This is not a scheme of work and must be used in conjunction with our school maths policy and curriculum documents. The White Rose Maths schemes of learning are be used for planning small steps to learning alongside mastery guidance from NCETM and this calculation policy.

2.2 This policy sets out the progression of strategies and written methods which children will be taught as they develop in their understanding of the four operations. Strategies are set out in a Concrete, Pictorial, Abstract (CPA) approach to develop children's deep understanding and mastery of mathematical concepts. Children use concrete objects to help them make sense of the concept or problem; this could be anything from real fruit, to straws, counters or cubes. This is then developed through the use of images, models and children's own pictorial representations before moving on to the abstract mathematics. Children will travel along this continuum again and again, often revisiting previous stages when a concept is extended. It is also worth noting that if a child has moved on from the concrete to the pictorial, it does not mean that the concrete cannot be used alongside the pictorial. Or if a child is working in the abstract, 'proving' something or 'working out' could involve use of the concrete or pictorial.

2.3 Similarly, although the strategies are taught in a progressive sequence, they are designed to equip children with a 'tool box' of skills and strategies that they can apply to solve problems in a range of contexts. So as a new strategy is taught it does not necessarily supersede the previous, but builds on prior learning to enable children to have a variety of tools to select from. As children become increasingly independent, they will be able to and must be encouraged to select those strategies which are most efficient for the task. The strategies are separated into the 4 operations for ease of reference.

2.4 However, it is intended that addition and subtraction, and multiplication and division will be taught together to ensure that children are making connections and seeing relationships in their mathematics. Therefore, some strategies will be taught simultaneously, for example, counting on (addition) and counting back (subtraction). Children should be moved through the strategies at a pace appropriate to their age related expectations as defined in the EYFS and NC. Effective teaching of the strategies rely on increasing levels of number sense, fluency and ability to reason mathematically. Children must be supported to gain depth of understanding within the strategy through the CPA approach and not learn strategies as a procedure.

3. IMPORTANCE OF VOCABULARY

3.2 The White Rose Maths Scheme places great emphasis on the importance of pupils using the correct mathematical language as a central part of their learning. Children will be unable to articulate their mathematical reasoning if they lack the mathematical vocabulary required to do so. It is therefore essential that teaching using the strategies outlined in this policy is accompanied by the use of appropriate mathematical vocabulary. New vocabulary should be introduced in a suitable context (for example, with relevant real objects, apparatus, pictures or diagrams) and explained carefully. High

expectations of the mathematical language used are essential, with teachers modelling and only accepting what is correct. For example:

Correct Vocabulary	Incorrect Vocabulary
Ones	units
Is equal to	Equals
Zero	Oh (o)
Number sentence / Equation	Sum (s)

4. MATHEMATICAL LANGUAGE

	Foundation Stage	Year 1	Year 2
Addition	add, more, and, make, sum, total, altogether, score, double, one more, two more, ten more…, how many more to make… ?, how many more is… than…?	number bonds, add, more, plus, make, sum, total, altogether, inverse double, near double, equals, is the same as (including equals sign), score, one more, two more… ten more, how many more to make…?, how many more is… than…?, how much more is…?	add, addition, more, plus, make, sum, total, altogether, score, double, near double, one more, two more… ten more… one hundred more, how many more to make…?, how many more is… than…?, how much more is…?, tens boundary
Subtraction	take (away), leave, how many are left/left over?, how many have gone?, one less, two less… ten less…,how many fewer is… than…?, difference between, is the same as	How many … were there first? How many were taken away? How many are there now? Subtract, take away, minus, leave, how many fewer is…than..?, how much less is..? half, halve, how many are left/left over?, how many are gone?, one less, two less, ten less…, how many fewer is… than…?, how much less is…? =, equals, sign, is the same as, count on, count back, difference between. how many more is…than..?, how much more is..?	subtract, minus, leave, how many are left/left over?, how many less is… than…?, how much fewer is…?, difference between, half, halve, equals, sign, is the same as, partition, inverse, count on , count back, one less, ten less… one hundred less.
Multiplication	group, lots of, double	odd, even, count in twos, fives, count in tens (forwards from/backwards from), how many times? lots of, groups of, once, twice, five times, ten times , multiple of, times, multiply, multiply by, array, row, column, double.	odd, even, twos, fives, tens, threes, lots of, groups of, once, twice, three times, five times, ten times, multiple of, times, multiply, multiply by, repeated addition, array, row, column, double.
Division		halve, share, share equally, groups, equal groups of, divide,	groups of, equal groups of, halve, share, share equally,

		divided by, left, left over	divide, divided by, divided into, repeated subtraction, inverse.

5. END OF YEAR EXPECTATIONS

EYFS	Year 1	Year 2
• Have a deep understanding of number to 10, including the composition of each number. • Subitise (recognise quantities without counting) up to 5. • Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts. • Verbally count beyond 20, recognising the pattern of the counting system. • Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity. • Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.	read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs • represent and use number bonds and related subtraction facts within 20 • add and subtract one-digit and two-digit numbers to 20, including zero • solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = ? – 9. • solve one-step problems involving multiplication and division, by calculating the answer using concrete objects • solve one-step problems involving multiplication and division using pictorial representations and arrays wit	solve problems with addition and subtraction: • using concrete objects and pictorial representations, including those involving numbers, quantities and measures • applying their increasing knowledge of mental and written methods • recall and use addition and subtraction facts to 20 fluently • derive and use related facts up to 100 • add and subtract numbers using concrete objects, pictorial representations, and mentally, including: o a two-digit number and ones o a two-digit number and tens o two two-digit numbers o adding three one-digit numbers • show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot • recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems • recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers • calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs • show that multiplication of two numbers can be done in

		any order (commutative) and division of one number by another cannot • solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts

6. MATHEMATICS IN THE EYFS

6.1 The objective for those working in Early Years is to ensure that all children develop firm mathematical foundations in a way that is engaging and appropriate for their age.

6.2 There are six main areas that collectively underpin children's early mathematical learning, and which provide the firm foundations for the maths that children will encounter as they go up the years in primary school.

6.3 They are:.

- **Cardinality and Counting:**

The cardinal value of a number refers to the quantity of things it represents, e.g. the numerosity, 'howmanyness', or 'threeness' of three. When children understand the cardinality of numbers, they know what the numbers mean in terms of knowing how many things they refer to. Counting is one way of establishing how many things are in a group, because the last number you say tells you how many there are. Children enjoy learning the sequence of counting numbers long before they understand the cardinal values of the numbers. Subitising is another way of recognising how many there are, without counting.

- **Comparison:**

Comparing numbers involves knowing which numbers are worth more or less than each other. This depends both on understanding cardinal values of numbers and also knowing that the later counting numbers are worth more (because the next number is always one more). This understanding underpins the mental number line which children will develop later, which represents the relative value of numbers, i.e how much bigger or smaller they are than each other.

- **Composition:**

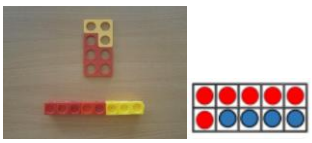
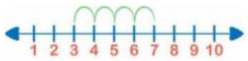
Knowing numbers are made up of two or more other smaller numbers involves 'part–whole' understanding. Learning to 'see' a whole number and its parts at the same time is a key development in children's number understanding. Partitioning numbers into other numbers and putting them back together again underpins understanding of addition and subtraction as inverse operations.

- **Pattern:**

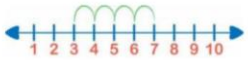
Seeking and exploring patterns is at the heart of mathematics (Schoenfeld, 1992). Developing an awareness of pattern helps young children to notice and understand mathematical relationships. Clements and Sarama (2007) identify that patterns may provide the foundations of algebraic thinking, since they provide the opportunity for young children to observe and verbalise generalisations.

6.4 The focus in this section is on repeating patterns, progressing from children copying simple alternating AB patterns to identifying different structures in the 'unit of repeat', such as ABB or ABBC. Patterns can be made with objects like coloured cubes, small toys, buttons and keys, and with outdoor materials like pine cones, leaves or large blocks, as well as with movements and sounds, linking with music, dance, phonics and rhymes. Children can also spot and create patterns in a range of other contexts, such as printed patterns, timetables, numbers and stories.

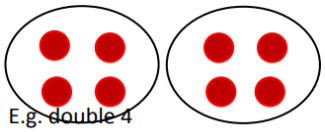
7. ADDITION IN EYFS

Concrete	Pictorial	Abstract
Children are encouraged to gain a sense of the number system through the use of counting concrete objects. They **combine 2 groups** in practical ways using counters, cubes, numicon and ten frames.   They also understand addition as **counting on** and will count on in using objects, cubes and beadstring.  They will show **number bonds to 10** using numicon and ten frame.  They will find **one more** than by singing counting songs, counting items, using numicon and using 5 and ten frames. They will be encouraged to see the link between counting forwards and the one more number.  	Children will learn to count on using a number line.  Place number cards in order and say which is one more. 1 2 3 4 5 6	They begin to use + and = They are encouraged to develop a mental picture of the number system in their heads to use for calculations. Higher attaining children may be able to represent their calculations using symbols and numbers within a written calculation.

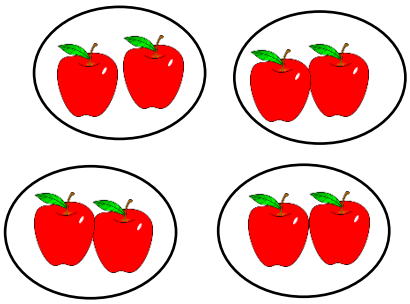
8. SUBTRACTION IN EYFS

Concrete	Pictorial	Abstract
 Children are encouraged to gain a sense of the number system through the use of counting concrete objects. They begin to 'take-away' using objects, counters, cubes and beadstring.  Children will also show this on a ten frame. They will find **one less** than by singing counting songs, counting items, using numicon and using 5 and ten frames. They will be encouraged to see the link between counting forwards and the one more number. 	 Children will learn to count back using a number line. They will also begin to record subtraction by 'crossing out' counters on a ten frame.  Place number cards in order and say which is one less. 1 2 3 4 5 6	They begin to use - and = They are encouraged to develop a mental picture of the number system in their heads to use for calculations. Higher attaining children may be able to represent their calculations using symbols and numbers within a written calculation.

9. MULTIPLICATION IN EYFS

Concrete	Pictorial	Abstract
Use counting equipment alongside numicon to get double an amount. 	Draw counters with same amount in both circles,  E.g. double 4	

10. DIVISION IN EYFS

Concrete	Pictorial	Abstract
Use counting equipment to **share** an even number of items between people or teddies for example. Count out one at a time to make sure each group is equal. E.g. "How can I share six animals between two monkeys?"  Children will be asked to make **groups** using the small world animals.	Draw pictures to show how they have shared between groups. E.g. 8 apples shared between 4 people: 	

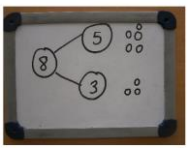
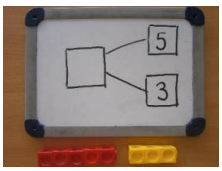
11. ADDITION IN YEAR 1

11.1 Add with numbers up to 20

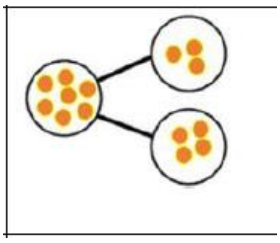
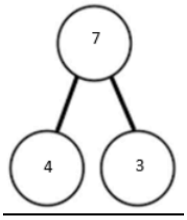
11.2 Key number skills for addition at Year 1:

- Read and write numbers to 100 forwards and backwards, from any given number.
- Read and write numbers from 1 – 20 in numerals and words.
- Recall bonds to 10 and 20 and addition facts within 20.
- Count to and across 100.
- Count in multiples of 1, 2, 5 and 10.
- Solve simple one step problems involving addition using objects, number lines and pictorial representations

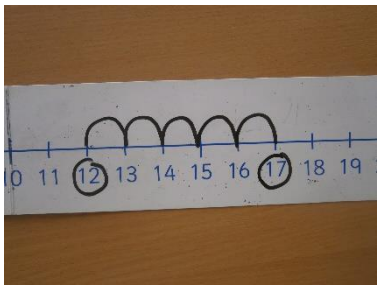
11.3 Number Bonds to 10

Concrete	Pictorial	Abstract
Begin with numbers to 10 ensuring the children are secure with these. Use numicon and bucket balance to show equivalence of numbers.  Use counting equipment such as cubes to add two parts together. 	Jottings to show workings out with 2 numbers being added together. Part-part-whole model with numbers given for children to draw.  Use ten frames (and numbers up to 10) to show number bonds.	Record as addition sentences: 3 + 5 = 8 5 + 3 = 8 8 = 3 + 5 8 = 5 + 3 Part-part-whole model with total missing. 

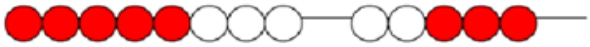
11.4 Combining two parts to make a whole

Concrete	Pictorial	Abstract
 	Children to represent the cubes using dots or crosses. They could put each part on a part whole model too.  .	4 + 3 = 7 Four is a part, 3 is a part and the whole is seven. 

11.5 Counting on using a number line.

Concrete	Pictorial	Abstract
 Start with the larger number on the bead string and then count on to the smaller number 1 by 1 to find the answer.	12 + 5 = 17  Start at the larger number on the number line and count on in ones or in one jump to find the answer.	12 + 5 = 17 Place the larger number in your head and count on the smaller number to find your answer.

Note: This builds on from prior learning of adding by combining two sets of objects into one group (5 cubes and 3 cubes) in Early Years.

 8 + 5 =

11.6 Children Should:

- Have access to a wide range of counting equipment, everyday objects, number tracks and number lines and be shown numbers in different contexts
- Understand that addition can be done in any order
- Read and write the addition (+) and equals (=) signs within number sentences
- Strengthen their understanding of the = sign
- Interpret addition number sentences and solve missing box problems, using concrete objects and number lines

12. ADDITION IN YEAR 2

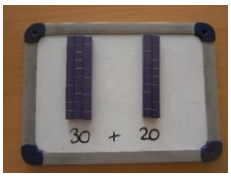
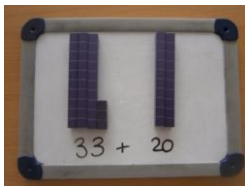
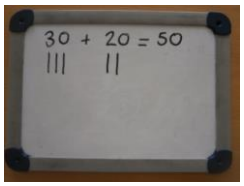
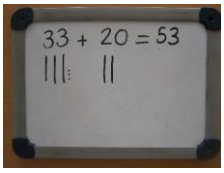
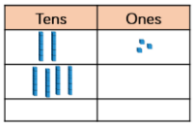
12.1 Add numbers with up to 2-digits

12.2 Key number skills for addition at Year 2:

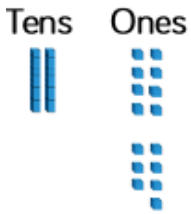
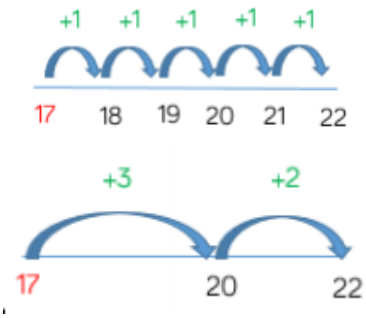
- Add a 2-digit number and ones (e.g. 27 + 6).
- Add a 2-digit number and tens (e.g. 23 + 40).
- Add pairs of 2-digit numbers which bridge ten (e.g. 35 + 47).
- Add three single digit numbers (5 + 9 + 7).
- Show that adding can be done in any order (the commutative law).
- Recall bonds to 20 and bonds of tens to 100.
- Count in steps of 2, 3 and 5 and count in tens from any number.
- Solve problems with addition, using concrete objects, pictorial representations, involving numbers, quantities and measures and applying mental and written methods.

12.3 Note: Continue to refer to the part-whole model and bar model to record addition and to support the commutative law.

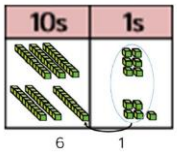
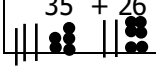
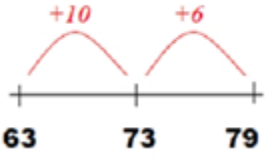
12.4 Adding a 2-digit number and tens

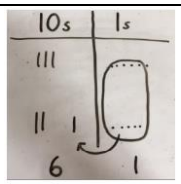
Concrete	Pictorial	Abstract
Use base ten sticks to add the two multiples of tens together.   	 When adding two multiples of ten, draw sticks to represent the base ten. When adding a 2digit and multiple of ten, draw the base ten as sticks and dots.  	Use place value charts alongside in preparation for column addition. 23 + 40.  When confident, children then use column addition to record. E.g. 28 + 7 **28** **7 +** **35**

12.5 Adding 2-digit number and ones

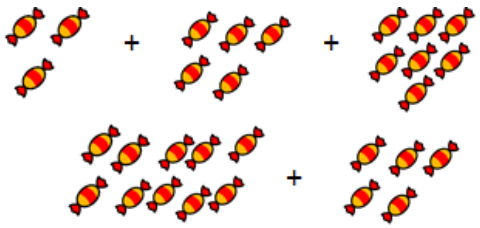
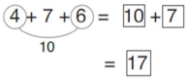
Concrete	Pictorial	Abstract
Children must have a strong understanding of place value here. They must first know that 1 ten is the same as 10 ones. Tens frames and counters used to support bridging ten when adding. Use base ten and numicon to count on from larger number. E.g. 28 + 7  	Children use a marked number line to record this as jumps of one. They move on to an unmarked number line and use their knowledge of number bonds to bridge ten first. 17 + 5 =  	When confident, children then use column addition to record. E.g. 28 + 7 **28** **7 +** **35**

12.6 Add pairs of 2-digit numbers (including bridging 10)

Concrete	Pictorial	Abstract
 Use place value charts to place the base ten and then use jottings to draw the tens and ones beneath the numbers. 35 + 26 = 	**63 + 16**  Use a number line to demonstrae visually Children to represent the base 10 in a place value chart.	Once children can add a multiple of ten to a 2-digit number mentally (e.g. 80+11) they are ready for adding pairs of 2-digit numbers that DO cross the tens boundary (e.g. 58 + 43). **28** **17 +** **45** **1**

Partition both numbers, add together the ones. Have we got 10 ones? Exchange 10 ones for 1 ten. How many ones do we have? How many tens do we have?		

12.7 Adding 3 single digits

Concrete	Pictorial	Abstract
4 + 7 + 6= 17 Put 4 and 6 together to make 10. Add on 7.  Following on from making 10, make 10 with 2 of the digits (if possible) then add on the third digit	 Add together three groups of objects. Draw a picture to recombine the groups to make 10.	 Combine the two numbers that make 10 and then add on the remainder.

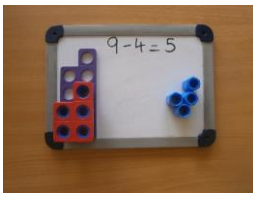
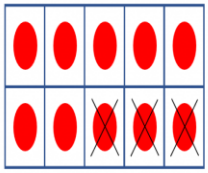
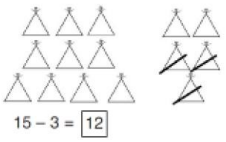
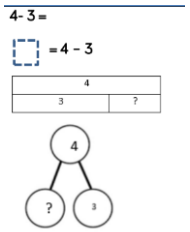
13. SUBTRACTION IN YEAR 1

13.1 Subtract from numbers up to 20

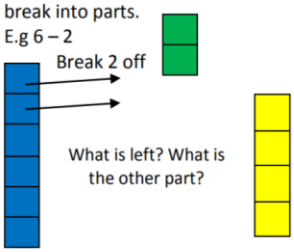
13.2 Key number skills for subtraction at Year 1:

- Given a number, say one more or one less.
- Count to and over 100, forward and back, from any number.
- Represent and use subtraction facts to 20 and within 20.
- Subtract with one-digit and two-digit numbers to 20 including zero.
- Solve one-step problems that involve addition and subtraction, using concrete objects (i.e. Bead string, objects, cubes) and pictures and missing number problems.
- Read and write numbers from 0 to 20 in numerals and words.

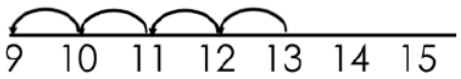
13.3 Subtracting by taking away ones (applicable up to 10)

Concrete	Pictorial	Abstract
Use physical objects, counters, cubes numicon etc to show how objects can be taken away.  10 – 3 = Counting the number of counters on to the ten frame and then removing the counters to find the answer. 	Cross out drawn objects to show what has been taken away. 	Look at how a part-whole model and bar model can be used to support understanding. 

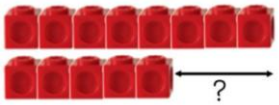
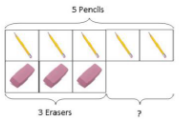
13.4 Subtraction as breaking apart (applies within 10)

Concrete	Pictorial	Abstract
Building on their understanding of finding a part, they are introduced to subtraction by partitioning. Use cubes to build towers then break into parts. E.g 6 – 2 Break 2 off  What is left? What is the other part?	Use stories to find missing parts. How many ice creams do not have flakes?  Draw pictures of this to support alongside tower of cubes. Represent this using a part-whole model.	Record as number sentence: 6 – 2 = 4 4 = 6 - 2

13.5 Subtracting by counting back

Concrete	Pictorial	Abstract
Make the larger number in your subtraction. Move the beads along your bead string as you count backwards in ones.  Use counters and move them away from the group as you take them away counting backwards as you go.	Count back on a number line or number track  	Put 13 in your head, count back 4. What number are you at? Use your fingers to help. Record as a number sentence.

13.6 Finding the difference

Concrete	Pictorial	Abstract
Compare amounts and objects to find the difference. Use cubes to build towers to find the difference.  	Count on to find the difference.  . Use basic bar models with items to find the difference.	Find the difference between 8 and 5. 8 – 5, the difference is ☐

14. SUBTRACTION IN YEAR 2

14.1 Subtract with 2-digit numbers

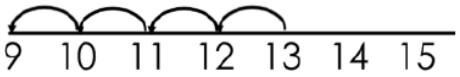
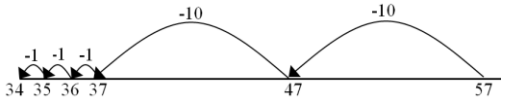
14.2 Key number skills for subtraction Year 2:

- Recognise the place value of each digit in a 2-digit number.
- Recall and use subtraction facts to 20 fluently and derive and use related facts up to 100.
- Subtract using concrete objects, pictorial representations, including a 2-digit number and units, a 2-digit number and tens and two 2-digit numbers.
- Show that subtraction cannot be done in any order.
- Read and write numbers to at least 100 in numerals and words.
- Solve simple addition and subtraction problems including measures, using concrete objects, pictorial representations and increasing confidence.

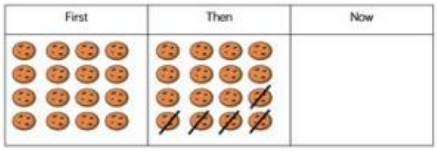
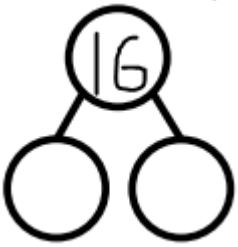
- Recognise and use inverse relationship between addition and subtraction, using this to check calculations and missing number problems.

14.3 Note: Continue to refer to the part-whole model and bar model to record subtraction and to support the commutative law.

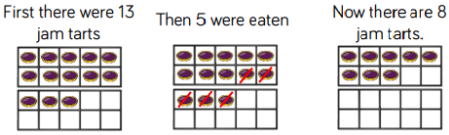
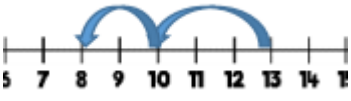
14.4 Subtraction – Counting back using a number line

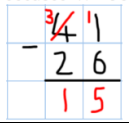
Concrete	Pictorial	Abstract
Make the larger number in  your subtraction. Move the beads along your bead string as you count backwards in ones. Use counters and move them away from the group as you take them away counting backwards as you go.	Count back on a number line or number track  Start at the bigger number and count back the smaller number showing the jumps on the number line. This can progress all the way to counting back using two 2-digit numbers. 	Put 13 in your head, count back 4. What number are you at? Use your fingers to help. Record as a number sentence.

14.5 Subtraction - not crossing 10

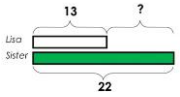
Concrete	Pictorial	Abstract
Build on language of subtraction within 20. Use of part-whole model key to reinforce number bonds within 20. Continue to subtract through stories (First, then, now) Use cubes, counters or other coutning items to represent what is needed in the story. 	First there were ___ biscuits Then ___ were eaten. Now there are ___ biscuits.  Use part-whole model alongside manipulatives.	16 – 5 = Move on to number lines to jump back in preparation for crossing ten.  Most able and when appropriate to move to column subtraction. 47 - 13 34

14.6 Subtraction - crossing 10

Concrete	Pictorial	Abstract
This small step focusses on the strategy of partitioning to make ten. Continue to use stories to support this step.  Use ten frames to place counters to represent the numbers here. 13 – 5 First show 13 – 3 = 10 Then 10 – 2 = 8	 Alongside the tens frames show this on a marked number line. Encourage children to partition the 1 digit number to see how to get to ten. 13 - 5 3 2	Record as 13 – 5 = 8 Can record steps after partitioning: 13 – 5 13 – 3 = 10

		10 – 2 = 8 Formal column method. Children must understand that when they have exchanged the 10 they still have 41 because 41 = 30 + 11. 

14.7 – Finding the Difference

Concrete	Pictorial	Abstract
 Compare objects and amounts to find the difference. Build towers to show the different amounts.	 Draw circles in rows then match. Shade on squared paper to show the two amounts. Count on a marked number line. Children jump along and count the jumps.	 Draw bars to find the difference. Jump back on a blank number line from one number to the other to see how much you have taken away

15. MULTIPLICATION IN YEAR 1

15.1 Multiply with concrete objects, arrays and pictorial representations

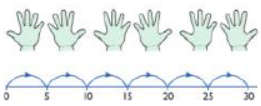
15.2 Key number skills for multiplication at Year 1:

- Count in multiples of 2, 5 and 10.
- Solve one-step problems involving multiplication, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.
- Make connections between arrays, number patterns, and counting in twos, fives and tens.
- Begin to understand doubling using concrete objects and pictorial representations.

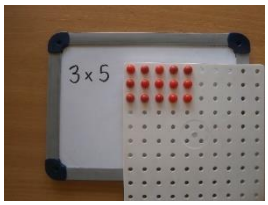
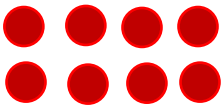
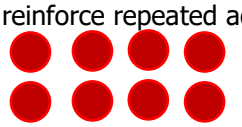
15.3 Doubling

Concrete	Pictorial	Abstract
Use practical activities to show how to double a number.  double 4 is 8 4 × 2 = 8	Draw pictures to show how to double a number. Double 4 is 8 	

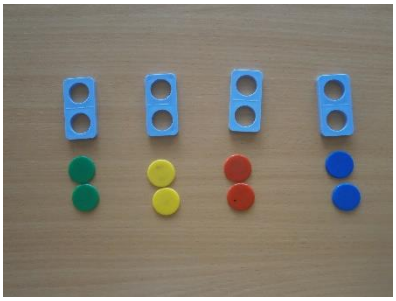
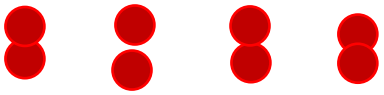
15.4 Counting in multiples

Concrete	Pictorial	Abstract
Count in multiples supported by concrete objects in equal groups. 	Use a number line or pictures to continue support in counting in multiples. 	Count in multiples of a number aloud. Write sequences with multiples of numbers. 2, 4, 6, 8, 10 5, 10, 15, 20, 25 , 30

15.5 Using Arrays to solve multiplication

Concrete	Pictorial	Abstract
Create arrays using pegs and boards, cubes and counters to show multiplication sentences. 	Draw arrays for multiplication sentences.  2 rows of 4 2 x 4 = 8	Use an array to write multiplication sentences and reinforce repeated addition.  4 + 4 = 8 2 + 2 + 2 + 2 = 8 2 x 4 = 8 4 x 2 = 8

15.6 Repeated Addition

Concrete	Pictorial	Abstract
Use counting equipment and numicon to find groups of the same number by adding together. 	Draw counters in sets to add together. 	Write addition sentences to describe objects and pictures.  2 + 2 + 2 + 2 + 2 = 10 Jump along a marked number line in repeated jumps.

16. MULTIPLICATION IN YEAR 2

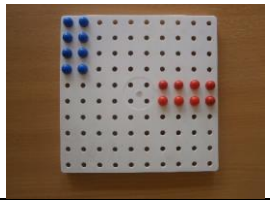
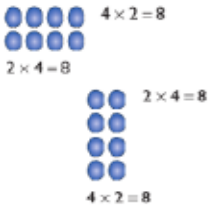
16.1 Multiply using arrays and repeated addition (using at least 2s, 5s and 10s)

16.2 Key number skills for multiplication at Year 2:

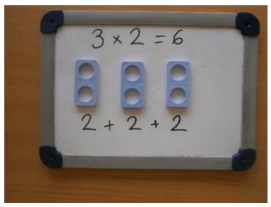
- Count in steps of 2, 3 and 5 from zero, and in 10s from any number.
- Recall and use multiplication facts from the 2, 5 and 10 multiplication tables, including recognising odds and evens.
- Write and calculate number sentences using the x and = signs.
- Show that multiplication can be done in any order (commutative).
- Solve a range of problems involving multiplication, using concrete objects, arrays, repeated addition, mental methods, and multiplication facts.
- Pupils use a variety of language to discuss and describe multiplication.

16.3 Note: Continue to refer to the part-whole model to support the commutative law.

16.4 Arrays showing commutative multiplication (gives the same result whatever the order of the digits)

Concrete	Pictorial	Abstract
Create arrays using pegs and boards, cubes and counters to show multiplication sentences..  	Draw arrays in different rotations to find **commutative** multiplication sentences.  	Use an array to write multiplication sentences and reinforce repeated addition.  5 + 5 + 5 = 15 3 + 3 + 3 + 3 + 3 = 15 3 x 5 = 15 5 x 3 = 15

16.5 Repeated Addition

Concrete	Pictorial	Abstract
See multiplication as 'groups of' or 'lots of' by collecting group of an amount using numicon and counting equipment.  	Draw counters in sets to add together. Record as repeated addition. 2 + 2 + 2 = 6 Show jumps on a marked number line. 	Record as repeated addition 2 + 2 + 2 = 6 3 x 2 = 6 Show jumps on a blank number line.

16.6 Use mental recall

Children should begin to recall multiplication facts for 2, 5 and 10 times tables through practice in counting and understanding of the operation.

17. DIVISION IN YEAR 1

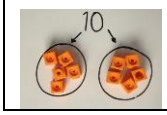
17.1 Group and share small quantities

17.2 Key number skills needed for division at Year1:

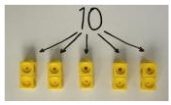
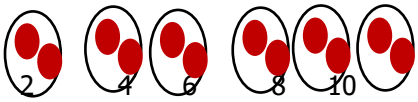
- Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations, arrays with the support of the teacher.
- Through grouping and sharing small quantities, pupils begin to understand division and finding simple fractions of objects, numbers and quantities.
- They make connections between arrays, number patterns, and counting in twos, fives and tens.

17.3 Note: Continue to refer to the part-whole model and bar model to support the commutative law.

17.4 Sharing Objects

Concrete	Pictorial	Abstract
Use everyday items and counting equipment to share between groups. E.g I have 10 cubes, can you share them equally in 2 groups?.   	Children use pictures or draw counters to share quantities. 	Share 9 buns between three people.

17.5 Division as grouping

Concrete	Pictorial	Abstract
Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding.  	Use jottings for groupings. E.g. How many equal groups of 2 are in 12? Draw groups if 2 until they have 12 in total. 	

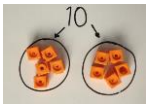
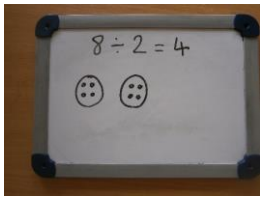
18. DIVISION IN YEAR 2

18.1 Group and share using the ÷ and = sign

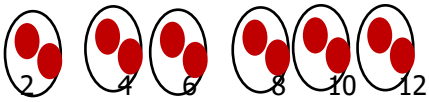
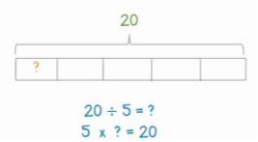
18.2 Key number skills needed for division at Year 2:

- Count in steps of 2, 3, and 5 from 0.
- Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers.
- Calculate mathematical sentences for multiplication and division within the multiplication tables and write them using the x, ÷ and = signs.
- Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot.
- Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.

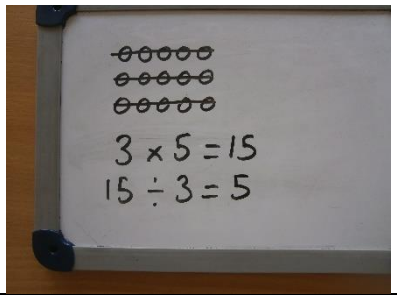
18.3 Division as sharing

Concrete	Pictorial	Abstract
Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding. 	Draw circles and share by drawing counters inside these one at a time. 	Divide 28 into 2 groups. How many are in each group? 28 ÷ 2 =

18.4 Division as grouping

Concrete	Pictorial	Abstract
Children use concrete manipulatives to group in a variety of ways. E.g. there are 6 sweets, how many people can have 2 sweets each? 	Use jottings for groupings. E.g. How many equal groups of 2 are in 12? Draw groups if 2 until they have 12 in total. 	Show on a bar model and refer to inverse relationship – multiplication. 

18.5 Division within arrays

Concrete	Pictorial	Abstract
 Link division to multiplication by creating an array and thinking about the number sentences that can be created. Eg 15 ÷ 3 = 5 5 x 3 = 15 15 ÷ 5 = 3 3 x 5 = 15	Draw an array and use lines to split the array into groups to make multiplication and division sentences. 	Find the inverse of multiplication and division sentences by creating four linking number sentences. 3 x 5 = 15 5 x 3 = 15 15 ÷ 3 = 5 15 ÷ 5 = 3