Maths Calculation Guide 2021

At Manby Lodge we want pupils to become fluent in the fundamentals of mathematics and to feel confident to reason and solve mathematical problems. We use the CPA approach to help pupils understand mathematics and make connections between different representations. We follow the White Rose Mastery scheme in EYFS and KS1 to ensure sequential learning, ensuring that teaching builds on what children already know, one of the recommendations from the research published by the 'Education Endowment Foundation' on improving mathematics teaching in EYFS and KS1. Following this research we are using opportunities to teach mathematics through every day experiences and have created a list of mathematical stories to support teaching different concepts.

	Reception	Year 1	Year 2
Mathematical experiences within every day experiences	• Talking about the time activities happen throughout the day each morning. • Using money and tills in role play. • Counting the number of children in self –registration. • Paying for snack using Numicon. (September introduce timing how long to collect fruit and counting out pieces.) • Measuring ingredients when cooking and making playdough. • Numbered pots of items in the classroom • Counting how many pieces of fruit in the fruit basket • Counting how many children are in today • Counting how many children are packed lunch/school dinners	• Using watches to monitor the time during the day. • Using money and tills in role play. • Measuring in a range of ways during independent learning. • Measuring ingredients when cooking. • Measuring and recording in science • Counting in 2s how many children are in today • Counting in 2s how many children are packed lunch/school dinners • Counting cubes in book vote • Visual timers for re-set time	• Measuring and recording in science • Measuring ingredients when cooking. • Counting resources in caddies – in 2s and 3s • Counting cubes in book vote in 2s and 3s • Visual timers for tidy up time

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Core mathematical stories	• The Three Little Pigs • Godilocks • Washing line-Jez Alborough • The Gingerbread Man • Mr Grumpy's Outing • The Enormous Turnip • The Bad Tempered Ladybird-Eric Carle • Peace at last- Jill Murphy • The very busy spider-Eric Carle • Cockatoos-Quentin Blake • Mr Magnolia- Quentin Blake • Rosie's Walk-Pat Hutchins • Little Red Riding Hood • The Shopping Basket-John Burningham • Kipper's toy box- Mick Inkpen • Six dinner Sid-Inga Moore • Titch- Pat Hutchins • Tall and Where's my Teddy-Jez Alborough	• One Big Pair of Underwear, Laura Gehl • How many Feet in the Bed? Diane Johnston Hamm • 100 Snowmen, Jennifer Dussling Arena • Ants Rule, The Long and Shirt of It, Bob Barner • The Shopping Basket, Jon Burningham • How Many Seends in a Pumpkin? Margaret McNamara • What's the Time Mr Wolf? Debi Gliori	• Penguin Place Value, Kathleen L Stone • Shark Swimathon, Stuart. J Murphy • The Trouble with Pets, Sheila Keenan • Don't Cout your Chickens, Simon Puttock • The Dragon's Scales, Sarah Albee • The Royal Treasure Measure, Trudy Harris

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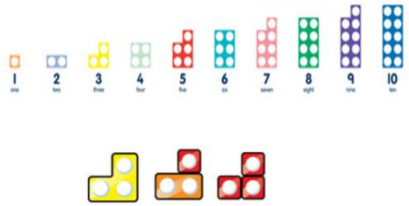
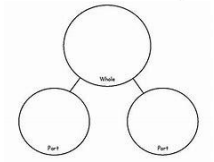
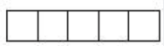
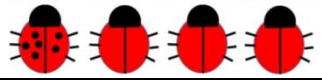
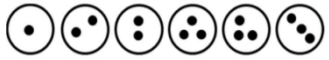
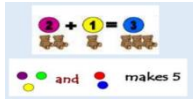
EYFS - Mathematics

Early learning goals:

- 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.

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.	Solve real-world mathematical problems with numbers up to 5
 Use the number shapes to investigate which smaller numbers combine to make 1, 2 and 3 Check by sitting them on top of the whole number.   Part whole model and 5 and 10 frames are used to make numbers in different ways. How many legs does a ladybird have? How many spots? Do you know any other creatures with 6 legs? Use counters to add 6 spots to the other ladybirds. Can you find more than one way to do it? 	  Tell your partner about the flowers. How many purple flowers can you see? How many blue flowers? How many flowers altogether? 	 Children can begin to combine groups of objects using concrete apparatus:  Construct number sentences verbally or using cards to go with practical activities. Children are encouraged to read number sentences aloud in different ways: • "Three add two equals 5" • "5 is equal to three and two" • "5 is the same as three and two" Concrete apparatus is used to relate subtraction to taking away and counting how many objects are left.	Ask the children to explore different ways of building the bonds to 10 E.g. How many ways can they find to park 10 cars in 2 car parks, place 10 fairies on 2 toadstools, 10 dinosaurs in 2 Jurassic parks.  Provide a basket of toys for the children to use to re-enact the story. Take turns to 'hide' one of the toys. Can the children spot which toy is missing? How many toys are there now? What if an extra toy arrives? How many will there be now? 

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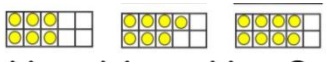
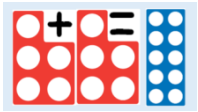
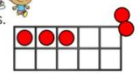
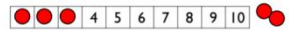
		 Arrange 4 items on a 5 frame – what do you notice? Prompt the children to notice that 4 is one less than 5 so there will always be one empty space.  Doubling  *Pair-wise patterns* 	Use first, then, now to tell simple maths stories to practise taking away in familiar contexts.  First there were 5 people on the bus. Then 2 people got off the bus. Now there are 3 people on the bus.  

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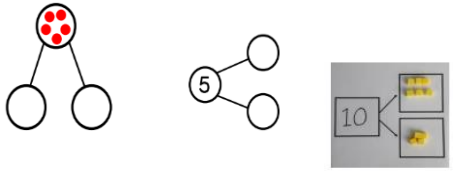
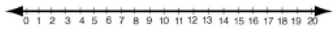
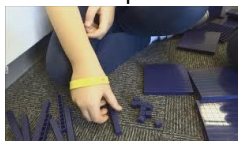
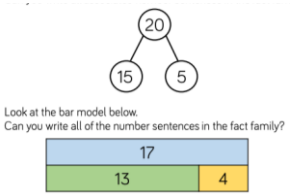
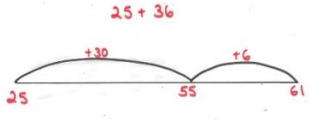
	Year 1	Year 2
Addition	Pupils memorise and reason with number bonds to 10 and 20 in several forms.	Practice addition to 20 and become increasing fluent in deriving facts.
	Using part whole models so children have an understanding of how number can be partitioned to support with number bonds and addition. Children in Reception will already have experience of partitioning.  Numicon and a range of objects/manipulative used for addition and number bonds with concrete resources first.  Images of objects used for addition and children to draw own pictures if needing support when adding (pictorial)  Understanding of counting on with a numbertrack  Understanding of counting on with a number line and counting on from a given number (supported by models and images).  7+4 Ten frames and double sided counters to be used for addition, specifically number	Methods taught in Year 1 should continue to be used to consolidate learning and understanding in Year 2. Topics are introduced with concrete objects first. Children will physically add using diennes and other manipulatives such as Numicon and counters.  Building on children's learning of number bonds to 10 and 20 chn will use the part whole and bar model to recall addition and subtraction facts to 20 and bonds to 100.  Continue to use number lines to partition when adding numbers.  Partitioning and bridging through 10. The steps in addition often bridge through a multiple of 10 e.g. Children should be able to partition the 7 to relate adding the 2 and then the 5. 8 + 7 = 15 Use of dienne to add 2 two digit numbers 47+25=

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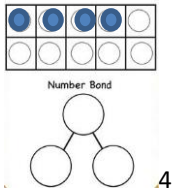
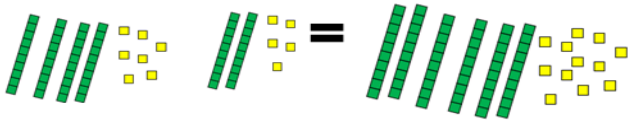
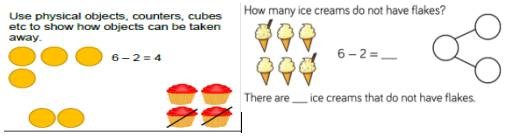
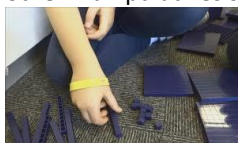
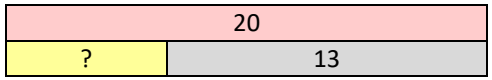
	bonds.  4 + ? = 10	47 + 25 = 72  Children work towards drawing own diennes to solve addition by drawing sticks and crosses. E.g. 22+ 11= || xx | x
Subtraction	**Year 1**	**Year 2**
	Pupils memorise and reason with number bonds in several forms (16 - 7 = 9 7 = 16 – 9)	Practise subtraction to 20 becoming increasingly fluent in deriving facts (such as; 10 - 7 = 3 7 = 10 – 3 to calculate 100 – 70 = 30 70 = 100 - 30)
	Language of subtraction and using crossing out to initially introduce subtraction.  Understand subtraction as take -away introduce subtraction symbol alongside concrete resources such as Numicon.  Chn will continue to use part part whole to build on the understanding of finding a part. Show chn subtraction by partition.  Missing number problems e.g. 7 = □ - 9; 20 - □ = 9; 15 – 9 = □; □ - □ = 11; 16 – 0 = □ Finding a part used to support missing number problems:	Methods taught in Year 1 should continue to be used to consolidate learning and understanding in Year 2. Topics are introduced with concrete objects first. Chn will physically take away using diennes and other manipulatives such as Numicon and counters.  Continue to build on the part whole model and introduce using bar model to solve missing number problems e.g. 52 – 8 = □; □ – 20 = 25; 22 = □ – 21; 6 + □ + 3 = 11 20 - ? = 13  Use number lines to model take-away and difference. E.g.

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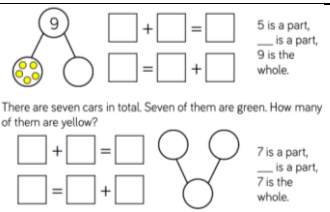
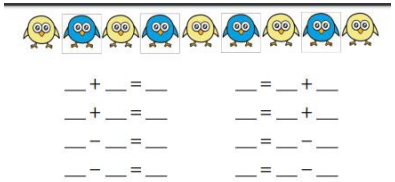
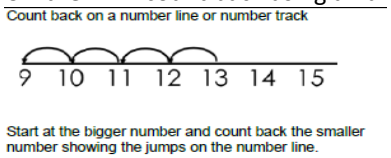


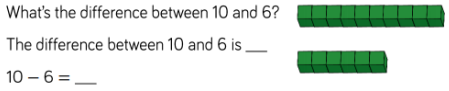
Children will use concrete and pictorial representations to see the relationship between addition and subtraction.

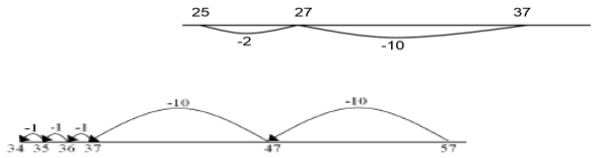


Children will count back using a number line.



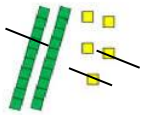
Subtraction as finding the difference- chn will use practical objects such as cubes to make bar models and find the difference between amounts.





This can progress all the way to counting back using two 2 digit numbers.

Pictorial images of diennes to support taking away 1 and 2 digit numbers



Children work towards drawing own diennes to solve subtraction by drawing sticks and crosses. E.g.

34-11=

Children will be taught to exchange a 10 stick for 10 crosses when needing to exchange.

Mult ipli	Year 1	Year 2
	Through grouping and sharing small quantities, pupils begin to understand doubling numbers and quantities. The children can count in twos, fives and tens.	Children practise and become fluent in the 2, 5 and 10 multiplication tables. They connect the 10 multiplication table to place value.

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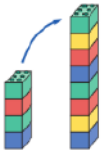
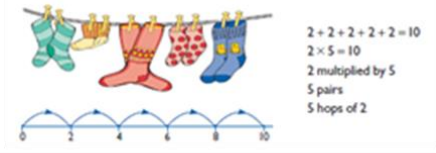
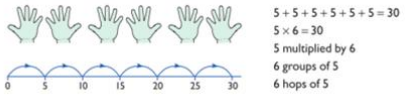
Understand multiplication is related to doubling and combing groups of the same size (repeated addition)

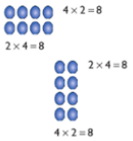


Washing line, and other practical resources for counting. Concrete objects. Numicon; bundles of straws, bead strings

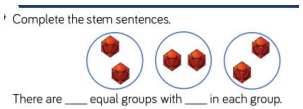




Problem solving with concrete objects (including money and measures. Use c numicon to develop the vocabulary relating to 'times' – Pick up five, 4 times. Use arrays to understand multiplication can be done in any order (commutative) introduce with chn having the opportunity to make practically before moving onto pictorial.



Children will use a variety of concrete resources to make equal groups



Children will use repeated addition building on year 1

There are ___ equal groups with ___ in each group.
There are ___ 3s.
___ + ___ = 6

Develop understanding of multiplication using array and number lines (see Year 1). Include multiplications not in the 2, 5 or 10 times tables. Begin to develop understanding of multiplication as scaling (3 times bigger/taller).

5 + 5 + 5 = 15

3 + 3 + 3 + 3 + 3 = 15

5 x 3 = 15

3 x 5 = 15

Children will use the finger method to solve multiplication e.g.4x5 counting up in 5s on 4 fingers.

Children will develop an understanding of the inverse and use practical resources to solve missing number problems.

7 x 2 = □ □ = 2 x 7

7 x □ = 14 14 = □ x 7

□ x 2 = 14 14 = 2 x □

□ x ◯ = 14 14 = □ x ◯

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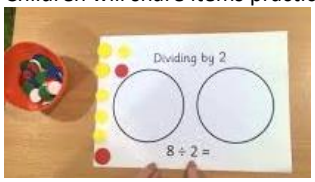
Division

Year 1

Through sharing small quantities, children begin to understand division, and finding simple fractions of amounts and quantities.

Children must have secure counting skills- being able to confidently count in 2s, 5s and 10s. Children should be given opportunities to reason about what they notice in number patterns.

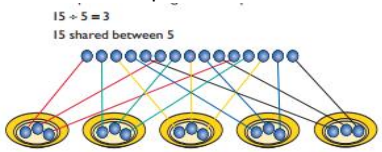
Children will share items practically using concrete objects.



Group AND **share small quantities- understanding the difference between the two concepts.**

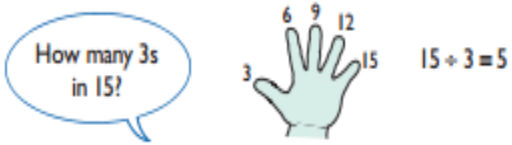
Sharing

Develops importance of one-to-one correspondence.



Grouping

Children should apply their counting skills to develop some understanding of grouping.

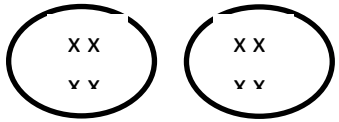


Year 2

Children practise and become fluent in their recall of the 2, 5 and 10 division facts.

Children will begin by continuing to use concrete resources to share items. (same as year 1) They will present this in a written method using 'sharing circles'

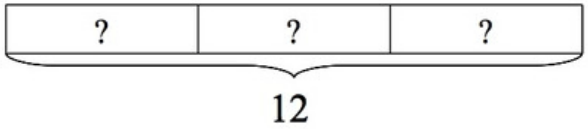
8÷2=4



Children will continue to group using the finger method as taught in year 1.

Sharing using a bar model

12÷ 3=?



Arrays

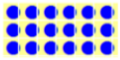
Continue work on arrays. Support children to understand how multiplication and division are inverse. Look at an array – what do you see?

3 x 4 = 12

12 ÷ 4 = 3

Missing number problems.

20 = □ x 5



3 = □ ÷ 6

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