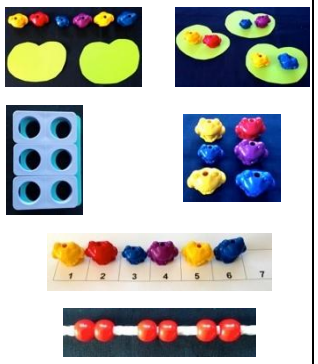
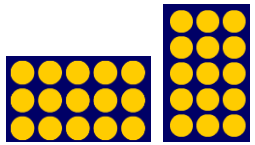
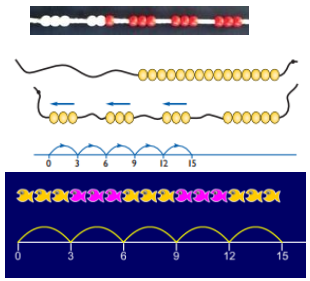
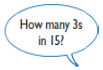
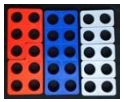
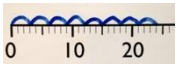
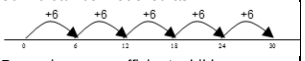
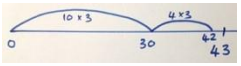
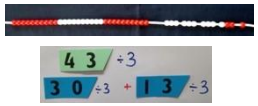
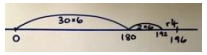
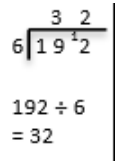
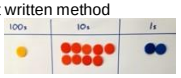
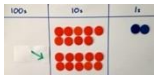
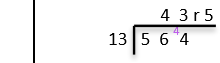
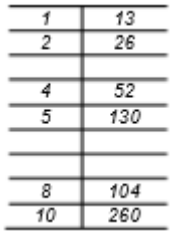
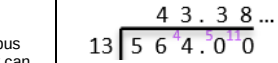
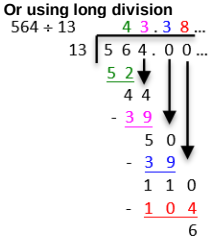
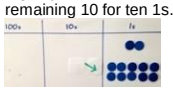
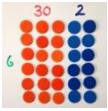
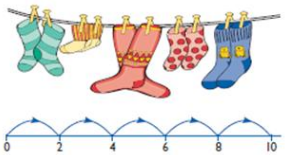
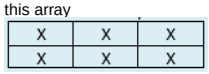
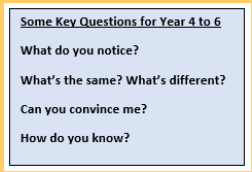
Division

Year	1	2	3	4	5	6
Written Methods: Developing conceptual understanding	Children should begin to understand division as both sharing and grouping. 6 ÷2 = 3 by **sharing** into 2 groups and by grabbing **groups** of 2  How many 2s? Children should apply their counting skills to develop some understanding of grouping.  They should use objects to group and share amounts to develop understanding of division in a practical sense. E.g. using Numicon to find out how many 5's are in 30? How many pairs of gloves if you have 12 gloves? Use of **arrays** as a pictorial representation for division. 15 ÷ 3 = 5 There are 5 groups of 3. 15 ÷ 5 = 3 There are 3 groups of 5.  Children should be given opportunities to reason about what they notice in number patterns. Children should be able to find ½ and ¼ and simple **fractions** of objects, numbers and quantities e.g. Here is a set of 12 pencils  How many is half the set?	Calculate mathematical statements for division within the multiplication tables and write them using the division (÷) and equals (=) signs. Sharing 15 ÷ 3 = 5 in each group   Link to fractions and arrays.  Grouping using a number line Number lines should continue to be an important image to support thinking. Group from zero in jumps of the divisor to find our 'how many groups of 3 are there in 15?'. 15 ÷ 3 = 5 groups of 3 (grouping)  Children who are able to count in twos, threes, fives and tens can use this knowledge to work out other facts such as 2 × 6, 5 × 4, 10 × 9. Show the children how to hold out their fingers and count, touching each finger in turn.   15 ÷ 3 = 5 The physical action can later be visualised without any actual movement. Continue work on arrays. Support children to understand how multiplication and division are inverse. Look at an array – what do you see? 10 ÷ 2 = 5  Use language of division linked to	Use practical and informal written methods to divide two-digit numbers (e.g. 50 ÷ 4) using known multiplication tables; round remainders up or down, depending on the context. How many 3s?   Grouping: How many 6s are in 30? 30 ÷ 6 can be modelled as:  Becoming more efficient: children need to be able to partition the dividend in different ways. 43 ÷ 3 If I know 10 x 3 …  Remainders can be shown as a 'jump' under the number line.  Place value counters can be used to support children apply their knowledge of grouping. For example: 60 ÷ 10 = How many groups of 10 in 60? 600 ÷ 100 = How many groups of 100 in 600? Use language of division linked to times tables on counting stick  They should be given opportunities to solve grouping and sharing problems practically (including where there is a remainder but the answer needs to given as a whole number). e.g. Pencils are sold in packs of 10. How many packs will I need to buy for 24 children? Children should be given the opportunity to further develop understanding of division (sharing) to be used to find a fraction of a quantity or measure.	Divide two-digit and three-digit numbers by a one-digit number using informal written methods with increasing efficiency, including division with remainders. **<u>Sharing, Grouping and using a number line (grouping using partitioning)</u>** Children will continue to explore division as sharing and grouping, and to represent calculations on a number line until they have a secure understanding. Using tables facts with which they are fluent, experiencing a logical progression in the numbers they use, for example: 1. Dividend just over 10x the divisor, e.g. 84 ÷ 7 2. Dividend over 20x the divisor, e.g. 196 ÷ 6 If I know 3 x 6 … then 30 x 6…  'Chunking up' on a number line (keeps links with multiplication explicit)  196 ÷ 6 = 32r4 3. Dividend over 100x the divisor, e.g. 840 ÷ 7  *Jottings* *7 x 100 = 700* *7 x 10 = 70* *7 x 20 = 140* All of the above stages should include calculations with remainders as well as without. **Remainders** should be interpreted according to the context. (i.e. rounded up or down to relate to the answer to the problem) E.g. Eggs are bought in boxes of 12. I need 140 eggs; how many boxes will I need to buy?	Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context. **Children continue to use chunking up on a number line.** Introduce two digit divisors e.g. dividend just over 10x the divisor when the divisor is a teen number, e.g. 173 ÷ 15 (learning sensible strategies for calculations such as 102 ÷ 17) Only move to formal methods when children have a good understanding of division and its links with multiplication. Make links between chunking up and the formal written methods. Ask: What's the same? What's different? **<u>Start with each digit being a multiple of the divisor</u>** e.g. 336÷3 'How many groups of 3 are there in the hundreds column?' 'How many groups of 3 are there in the tens column?' 'How many groups of 3 are there in the units/ones column?'  When children have conceptual understanding and fluency using the bus stop method without remainders, they can then progress onto 'carrying' their remainder across to the next digit.  192 ÷ 6 using place value counters to support written method  Regroup the 100 into 10s  Put 10s into groups of 6 or share between 6. 	Use written division methods in cases where the answer has up to two decimal places Divide numbers up to 4 digits by a two-digit whole number using the formal written methods of short or long division where appropriate, interpreting remainders as whole number remainders, fractions, or by rounding, as appropriate for the context. 564 ÷ 13  Using known multiplication facts  564 ÷ 13 = 43 r 5 = 43 $\frac{5}{13}$ = 43.38...  **Or using long division**  = 43 r 5 = 43 $\frac{5}{13}$ = 43.4 (to 1dp) Continue to use the language of 'grouping'. Children begin to practically develop their understanding of how express the remainder as a decimal or a fraction. Ensure practical understanding allows children to work through this (e.g. what could I do with this remaining 1? How could I share this between 6 as well?)

Year	1	2	3	4	5	6
		times tables on counting stick.  Children should be given opportunities to find a half, a quarter and a third of shapes, objects, numbers and quantities. Finding a fraction of a number of objects should be related to sharing. They will explore visually and understand how some fractions are equivalent – e.g. two quarters is the same as one half.	3 apples shared between 4 people = ¾ 		3 groups so that is 30 x 6, exchange remaining 10 for ten 1s.   So 192 ÷ 6 = 32 	
Supporting mental strategies: with jottings or in your head	**Counting** Children should experience regular counting on and back from different numbers in 1s and in multiples of 2, 5 and 10. They should begin to recognise the number of groups counted to support understanding of relationship between multiplication and division.  **Practical contexts:** Here are 10 Lego people If 2 people fit into the train carriage, how many carriages do we need?	**Counting** Children should count regularly, on and back, in steps of 2, 3, 5 and 10. Understand that halving is the inverse of doubling and derive and recall halves of even numbers to 40, and halves of multiples of 10 up to 100. **Missing number problems** **÷ = signs and missing numbers** 6 ÷ 2 = □ □ = 6 ÷ 2 6 ÷ □ = 3 3 = 6 ÷ □ □ ÷ 2 = 3 3 = □ ÷ 2 □ ÷ ∇ = 3 3 = □ ÷ ∇ 10 = 5 x □ What number could be written in the box? Use a clock face to support understanding of counting in 5s. Use money to support counting in 2s, 5s, 10s, 20s, 50s Write the number sentences to describe this array  What do you notice? **Prove It** Which four number sentences link these numbers? 3, 5, 15? Prove it.	**Counting** Children should continue to count regularly, on and back, now including multiples of 4, 8, 50, and 100, and steps of 1/10. **Missing number problems:** Continue with a range of equations as in Y2 but with appropriate numbers. Use doubling and **halving** to support mental calculations. **Halve** 2 digit numbers and multiples of 10 (including 3 digit multiples) using partitioning The number line should continue to be used as an important image to support thinking, and the use of informal jottings and drawings to solve problems should be encouraged. Children will make use multiplication and division facts they know to make links with other facts. 3 x 2 = 6, 6 ÷ 3 = 2, 2 = 6 ÷ 3 30 x 2 = 60, 60 ÷ 3 = 20, 2 = 60 ÷ 30	**Counting** Children should continue to count regularly, on and back, now including multiples of 6, 7, 9, 25 and 1000, and steps of 1/100. **Missing number problems**: What goes in the missing box? 6□ x 4 = 512 Prove it. How close can you get to 4500 using the digits 3,4 and 6 in the following? □□□ X 7 Use place value, known and derived facts, including doubling and **halving**, to divide mentally, including dividing by 1. Find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths. **Mental methods** Solving practical problems where children need to scale down. Relate to known number facts. Use the context of a week and a calendar to support the 7 times table (e.g. how many days in 5 weeks?) Use of finger strategy for 9 times table. Children should be encouraged to choose from a range of strategies: * Partitioning using x10, x20 etc * Halving to solve ÷2, ÷4, ÷8 * Recall of times tables **Use a fact** 63 ÷ 9 = 7 Use this fact to work out 126 ÷ 9 = 252 ÷ 7 =	**Counting** Children should continue to count regularly, on and back, now including steps of powers of 10. **Missing number/digit problems**: continue to use to deepen understanding 6 x 0.9 = □ x 0.03 6 x 0.04 = 0.008 x □ Which numbers could be written in the boxes? **Mental methods** ÷ by 10, 100, 1000, including decimals Solving practical problems where children need to scale down. Relate to known number facts. Identify factors, including finding all factor pairs of a number, and common factors of two numbers. Children should be encouraged to choose from a range of strategies to solve problems mentally: * Partitioning using x10, x20 etc * Halving to solve ÷2, ÷4, ÷8 If children know the times table facts to 12 x 12. Can they use this to recite/derive other times tables (e.g. the 13 times tables or the 24 times table) **Use a fact** 3 x 75 = 225 Use this fact to work out 450 ÷ 6 = 225 ÷ 0.6 = To multiply by 25, you multiply by 100 and then divide by 4. Use this strategy to solve 48 x 25 78 x 25 4.6 x 25	**Counting** Children should count regularly, building on previous work in previous years. **Missing number/digit problems:** 2.4 ÷ 0.3 = □ x 1.25 Which number could be written in the box? Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers; establish whether a number up to 100 is prime. Identify common factors, common multiples and prime factors. Use estimation to check answers to calculations **Mental methods** Children should experiment with order of operations, investigating the effect of positioning the brackets in different places, e.g. 20 – 5 x 3 = 5; (20 – 5) x 3 = 45 They should be encouraged to choose from a range of strategies to solve problems mentally: * Partitioning using x10, x20 etc * Halving to solve ÷2, ÷4, ÷8 If children know the times table facts to 12 x 12. Can they use this to recite/derive other times tables (e.g. the 13 times tables or the 24 times table) **Use a fact** 12 x 1.1 = 13.2 Use this fact to work out 15.4 ÷ 1.1 = 27.5 ÷ 1.1 =
Just know it!	Count in multiples of 2s, 5s and 10s.	Recall and use division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers. **Achieve bronze and silver for 2x, 5x and 10x tables**	Recall and use division facts for the 3, 4 and 8 multiplication tables. **Achieve golds for 10, 2, 5, 4, 8 and 3 times tables and bronzes for 6, 7, 9, 11 and 12.**	Recall division facts for multiplication tables up to 12 × 12 **Complete times table number card.**	Recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3}) **Maintain fluency in times tables and move onto the mental methods number cards.**	Recall prime numbers up to 19. **Maintain fluency in times tables and complete mental methods number cards.**
Vocabulary	share, share equally, one each, two each…, group, groups of, lots of, array	group in pairs, 3s … 10s etc equal groups of divide, ÷, divided by, divided into, remainder, quotient, divisor, dividend	See Y1 and Y2	see years 1-3 divide, divided by, divisible by, divided into share between, groups of, factor, factor pair, multiple, times as (big, long, wide …etc) equals, remainder, quotient, divisor inverse	see year 4 common factors, short division, square number, cube number, inverse, power of	See previous years prime numbers, composite numbers (non-prime)
Reasoning	•True or false? I can only halve even numbers. •Grouping and sharing are different types of problems. Some problems need solving by grouping and some by sharing. Encourage children to practically	• True or false? 2÷10 is the same as 10÷2; When you count up in tens starting at 5 there will always be 5 units. • Noticing how counting in multiples of 2 and 5 to 10 relates to the number of	• Inverses and related facts – develop fluency in finding related multiplication and division facts. • Develop the knowledge that the inverse relationship can be used as a checking method.	• True or false? Dividing by 10 is the same as dividing by 2 and then dividing by 5. Can you find any more rules like this? • Is it sometimes, always or never true that □ ÷ Δ = Δ ÷ □? Sometimes, always, never true questions	The = sign means equality. Take it in turn to change one side of this equation, using multiplication and division, e.g. Start: 24 = 24 Player 1: 4 x 6 = 24 Player 2: 4 x 6 = 12 x 2	Order of operations: brackets first, then division and multiplication (left to right) before addition and subtraction (left to right). Children could learn a mnemonic such as BODMAS, or could be encouraged

Year	1	2	3	4	5	6
	work out which they are doing.	groups you have counted. • An understanding of the more you share between, the less each person will get (e.g. would you prefer to share these grapes between 2 people or 3 people? Why?		about multiples and divisibility. E.g.: •Multiples of 5 end in 0 or 5. •The digital root of a multiple of 3 will be 3, 6 or 9. •The sum of 4 even numbers is divisible by 4.	Player 1: 48 ÷ 2 = 12 x 2 Sometimes, always, never true questions about multiples and divisibility. E.g.: •If the last two digits of a number are divisible by 4, the number will be divisible by 4. •If the digital root of a number is 9, the number will be divisible by 9. •When you square an even number the result will be divisible by 4 (one example of 'proof' shown right)	to design their own ways of remembering. Sometimes, always, never true questions about multiples and divisibility. E.g.: If a number is divisible by 3 and 4, it will also be divisible by 12. (also see year 4 and 5) Using what you know about rules of divisibility, do you think 7919 is a prime number? Explain your answer.
Questions	How many groups of…? How many in each group? Share… equally into… What can do you notice?	How many 10s can you subtract from 60? I think of a number and double it. My answer is 8. What was my number? If 12 x 2 = 24, what is 24 ÷ 2? Questions in the context of money and measures (e.g. I have 30p in my pocket in 5p coins. How many coins do I have?)	Questions in the context of money and measures that involve remainders (e.g. How many lengths of 10cm can I cut from 81cm of string? You have £54. How many £10 teddies can you buy?) What is the missing number? 17 = 5 x 3 + __ ; __ = 2 x 8 + 1			
Half-termly focus for starters	Count back 2s.	Division facts for 10 times table.	Review division facts for 10, 2, and 5 times table.	Division facts for 4x and 8x tables; understand 10 times smaller.	Division facts for 4x and 8x tables; understand 100 and 1000 times smaller.	Division facts up to 12 x 12
	Count back 10s	Division facts for 5 times table.	Division facts for 4x table	Division facts for 3x, 6x and 12x tables	Division facts for 3x, 6x and 12x tables; partition to divide mentally	Partition to divide mentally
	Know halves up to 20.	Halves of even numbers up to 40	Halve any 2-digit number	Halve larger numbers and decimals	Halve larger numbers and decimals	Halve larger numbers and decimals
	Count back in 5s.	Division facts for 2x table	Division facts for 8x table	Division facts for 3x and 9x tables	Division facts for 3x and 9x tables; understand 100 and 1000 times smaller	Division facts up to 12 x 12
	Halve multiples of 10.	Count back in 3s	Division facts for 3x table	Division facts for 11x and 7x tables	Review division facts for 11x and 7x tables; partition decimals to divide mentally	Partition to divide mentally
	How many 2s? 5s? 10s?	Review division facts for 10, 2, and 5 times table	Division facts for 6x table or review other division facts.	Division facts for 6x and 12x tables	Review division facts for 6x and 12x tables; halve larger numbers and decimals	Halve larger numbers and decimals