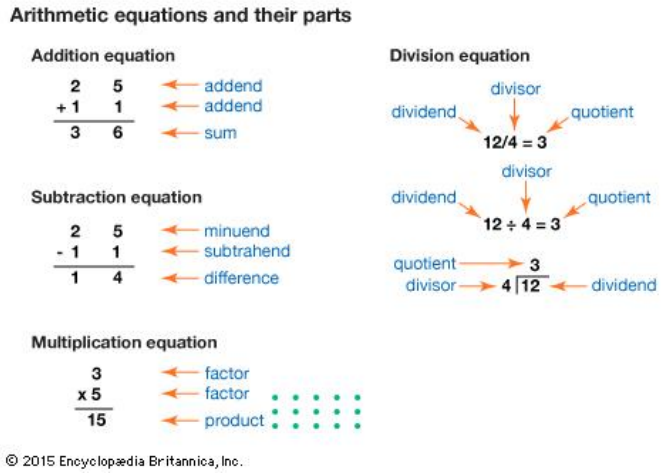
St. Joseph's Catholic Primary School

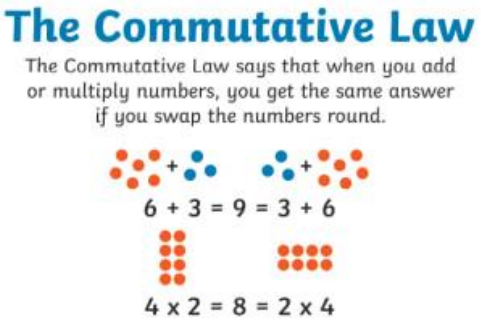
Fluency Progression Document

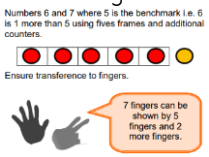
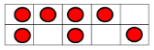
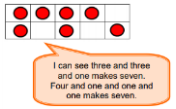
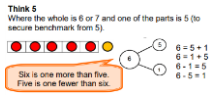
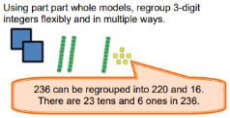
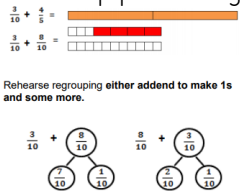
The NCETM set out 5 main ideas for mastery: including coherence, representations, variation, mathematical thinking and fluency. They state that fluency is more than just memorisation of a single procedure or collection of facts. Quick and efficient recall of facts and procedures is important in order for children to keep track of sub-problems, think strategically and solve problems. Fluency also demands the flexibility to move between different contexts and representations of mathematics, to recognise relationships and make connections.

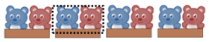
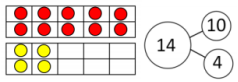
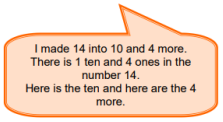
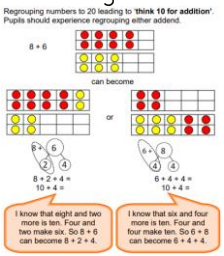
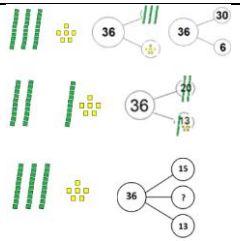
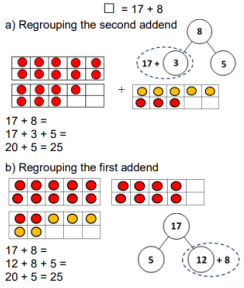
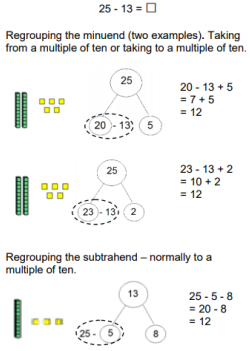
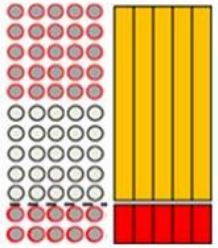
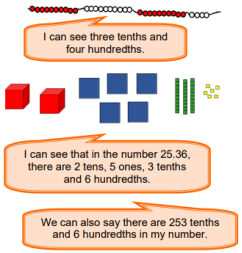
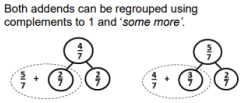
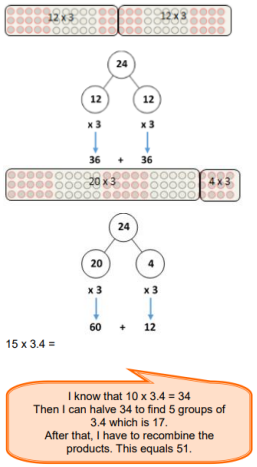
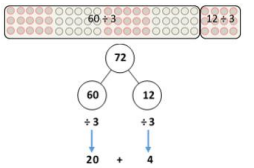
These are broken down below into skills which each year group should focus on and children should be encouraged to regularly use and compare the different methods. Word aware and terminology is highly important in supporting the children's understanding of these different methods. Presenting the terminology on the working wall and modeling the terminology is paramount- understanding what is expected in each method and the steps they need to follow.

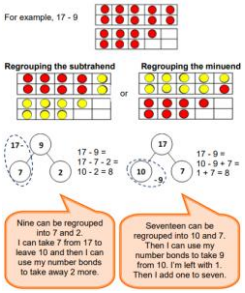
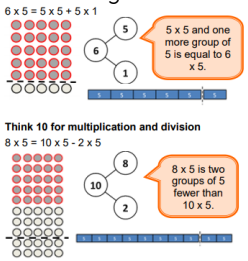
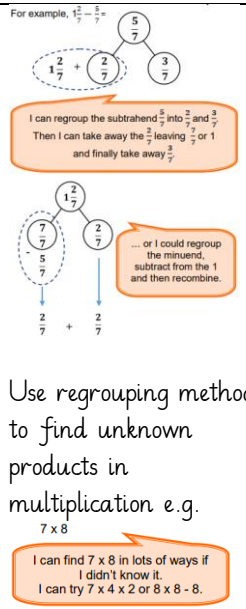
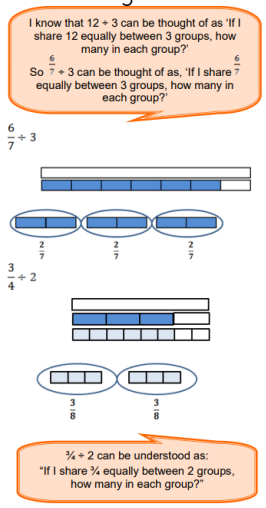
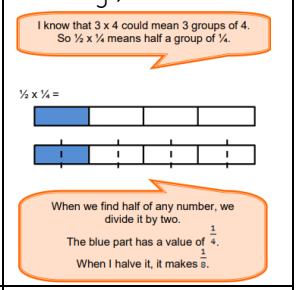
Definitions

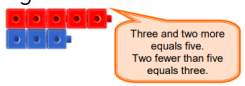
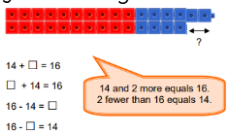
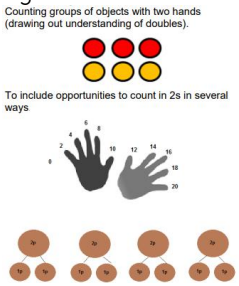
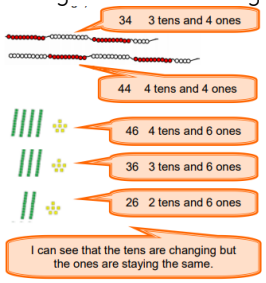
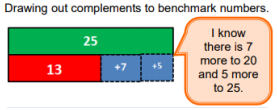
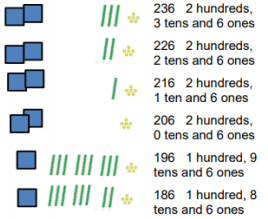
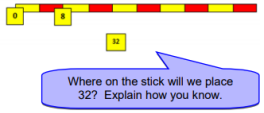
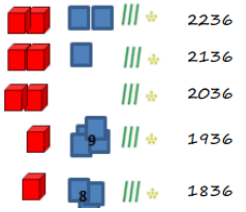
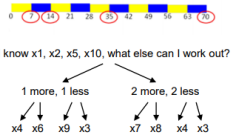


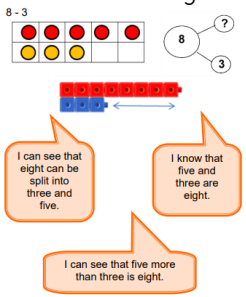
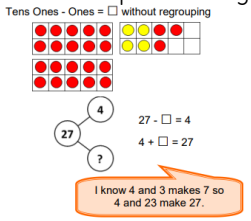
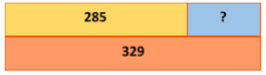
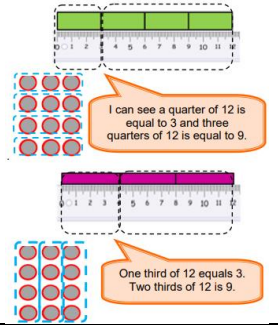


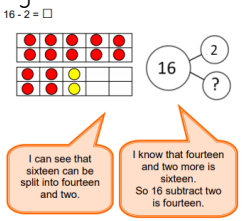
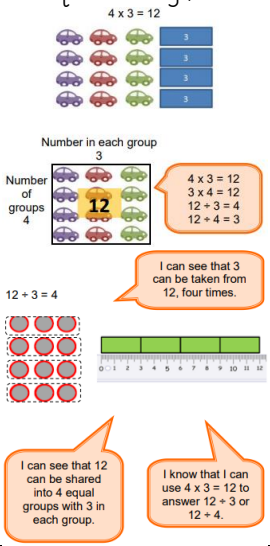
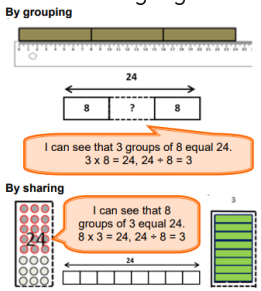
Fluency skill	Reception	Year 1	Year 2	Year 3	Year 4	Years 5 and 6
Subitising	Recognise groups up to 5 without the need to count Identify 5 and use as a benchmark number e.g.  Identify numbers within a whole set e.g.  I can see 3 and 3 and 1. I can see 4 and 1 and 1 and 1. I can see 4 and 3.	Recognise groups (up to 5) without the need to count and use this to identify numbers up to 10 				
Regrouping (partitioning)	Use 5 as a benchmark number  Understand a whole = part and part	'Think 10' – able to partition a number into 10 and some	Regroup two-digit numbers flexibly and in multiple ways e.g.	Regroup three-digit numbers flexibly and multiple ways e.g.  Regroup for addition to allow bridging through	Regroup four-digit numbers flexibly and in multiple ways Regroup tenths and hundredths flexibly and	Use regrouping as a valid method in a multi-step problem e.g., 

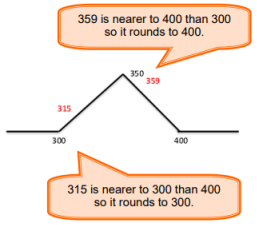
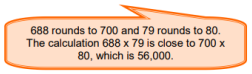
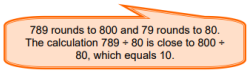
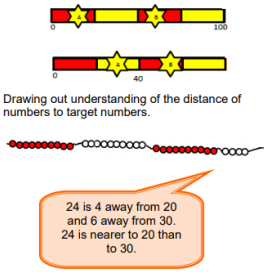
	 Identify a group as a unit e.g., a unit is 2 teddies 	more e.g.   Able to regroup a whole up to 10 into different parts and understand the commutativity of this Able to use 10 as a benchmark for regrouping for addition up to 20 (think "10 and some more") e.g.,  Able to use 10 as a benchmark for regrouping for subtraction up to 20, using either the	 Able to 'think 10' for addition e.g.,  Able to 'think 10' for subtraction e.g., 	10 and 100. Work flexibly and reason about the most efficient methods. Regroup for subtraction to allow bridging through 10 and 100. In multiplication, regroup to the 10-benchmark working flexibly to regroup either the multiplier or the multiplicand e.g., 12 x 5  12 x 5 = 10 x 5 + 2 x 5	in multiple ways e.g.,  In addition, regroup to 'think 100' with more complex 3-digit addends e.g.,  In subtraction, regroup to 'think 100' with more complex 3-digit numbers Use regrouping strategies to fractional part wholes, as well as other measures such as time and money e.g. 	Regroup for multiplication in a variety of ways e.g., 24 x 3  Regroup for division in a variety of ways e.g., 72 ÷ 3  Regroup for division of fractions by whole

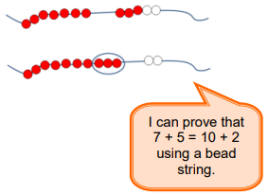
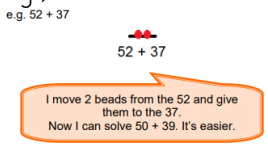
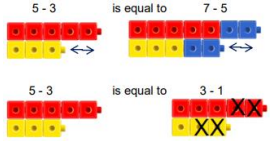
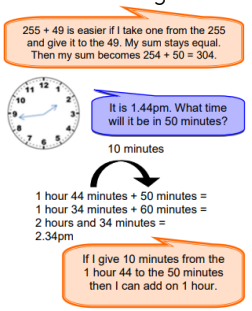
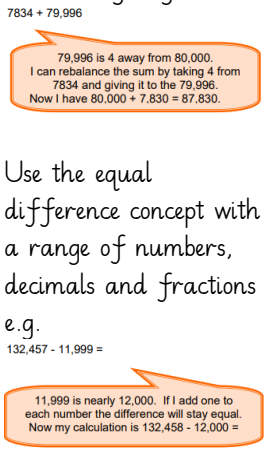
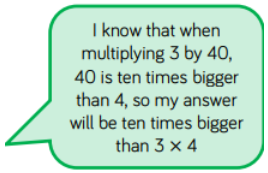
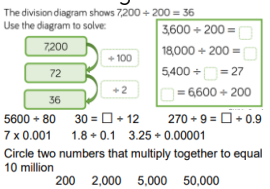
		minuend or the subtrahend, bridging through ten e.g. 	'Think 5' for multiplication and division e.g. 		 Use regrouping methods to find unknown products in multiplication e.g. 7 x 8 I can find 7 x 8 in lots of ways if I didn't know it. I can try 7 x 4 x 2 or 8 x 8 - 8.	numbers e.g.,  Regroup fractions for multiplication (focus on this understanding before applying the rule) e.g., 
Counting on and back	Be able to count fluently. To do this, children need to have mastered:	Count on to find the total and difference	Count on and back from any two-digit number and notice what	Count on and back from any three-digit number and notice	Count on and back from any four-digit number and notice what changes and what	

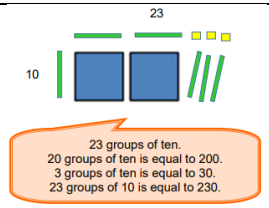
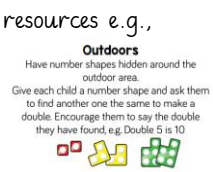
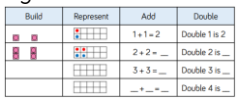
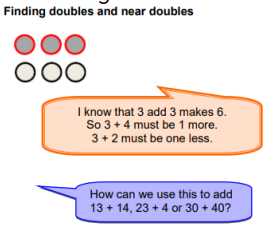
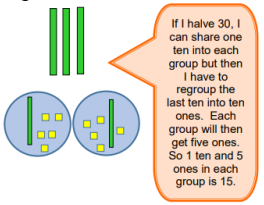
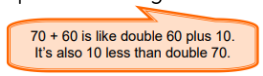
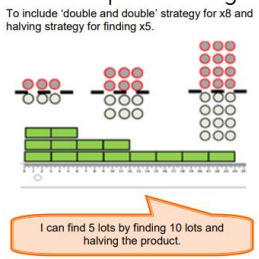
	The one-one principle – each object is counted once and given one counting tag The stable-order principle –we use the words in the same order The abstraction principle - counting can apply to objects which are not tangible e.g., number of claps The order-irrelevance principle - it doesn't matter which order we count objects in Be able to identify the largest number and count on from it	e.g.  Count on to find the total and difference and link this knowledge to fact families e.g.,  Be able to skip count in a variety of ways to promote the 2x tables and doubles e.g.,  Be able to skip count in 5s and 10s in a variety of ways, forwards, backwards	changes and doesn't e.g.  Skip count in 3's in a variety of ways, forwards, backwards and from different starting points. Count on to find complements to benchmark numbers within 100 e.g. 	what changes and what doesn't e.g.  Understand the connections between the 3, 4 and 8 times tables and know strategies to be able to work out unknowns e.g. 	doesn't e.g.  Count on and back in multiples and make counting connections e.g., counting in 6's, 60's, 600's, 0.6's Count in 25's, 50's, 0.1's and 0.001's Skip count all the times tables and understand the connections between them 	

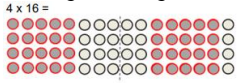
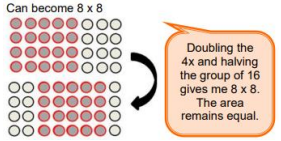
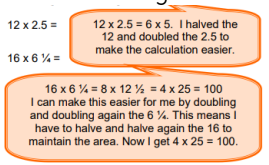
		and from different starting points.				
Reordering and finding complements		Reorder to ensure efficient counting e.g., There are 6 animals.  How many different ways can you sort the animals?	Reorder numbers to find complements when adding three one-digit numbers e.g. 6+7+4 (add the 6 and 4 first to make 10)	Reorder three or more numbers up to 1000 to find complements e.g., 75+95+25 can be reordered into 75+25 to make the benchmark 100, then add 95 to total 195. Or 6+9+4+5+1 (reorder to make number bonds to 10)	Reorder three or more numbers up to 10,000 to find complements e.g., 800+240+360 310+700+30 = Reorder three or more numbers involving tenths and hundredths to find complements e.g., 1.5+3+0.5 3+1+1 (0.5+0.5)	Reorder three or more numbers to find complements where the arrangement is more complex e.g. £3.99+£7.80+£2.01
Applying the inverse		Think addition to solve subtraction with numbers to 10 e.g.,  Think addition to solve subtraction with numbers up to 20	Think addition to solve subtraction with numbers up to 100 e.g.,  Understand the relationship between multiplication and division. In multiplication, understand the interrelationship between	Think addition to solve subtraction with numbers up to 1000 e.g.,  329 - 285 = ☐ so 285 + ☐ = 329 Think multiplication for division by grouping	Use the inverse to solve missing number equations e.g., 14 + ____ = 30 30 – 14 = 16 Make further connections between multiplication and division and fractions  	Use the inverse to solve missing number equations e.g., 14 + ____ = 30 30 – 14 = 16 Using BODMAS to practice using inverse equations.

		e.g. 16 - 2 = □  	multiplier, multiplicand and product. In division, understand the relationship between the dividend, divisor and quotient e.g.,  	AND sharing e.g.,  		
Rounding				Identify the midpoint between a set of numbers under 1000 (and use this in order to understand	Round to the nearest 10, 100, 1000 and other units such as money and time Use number lines right throughout KS2. Using the rhyme 0-4 touch the floor, 5-9 climb the vine	Round to the nearest 10, 100, 1000, 10,000 and other units such as money, time, decimal numbers, negative numbers Use rounding as an estimation for multiplication and

				rounding) e.g.,  Use number lines right throughout KS2. Using the rhyme 0-4 touch the floor, 5-9 climb the vine.		division e.g., 688 x 79 =  789 ÷ 79 = 
Estimation			Estimate the distance of numbers from target numbers under 100 e.g.,  	Estimate the distance of numbers from target numbers under 1000 to prepare for rounding e.g., 234 is 4 from 230 and 6 from 240. 234 is nearer to 230 than 240	Estimate the distance of numbers from target numbers up to 10,000, including tenths and hundredths to prepare for rounding e.g., 2134 is 34 from 2100 and 66 from 2200. 2134 is nearer to 2100 than 2200.	Estimate the distance of numbers from target numbers up to 1,000,000, including decimal numbers and negative numbers, to prepare for rounding e.g., 20,034 is 4 from 20,030 and 6 from 20,040. 20,034 is nearer to 20,030 than to 20,040.
Rebalancing			Understand the concept of equal sum (that the sum remains equal when the addends are rebalanced in addition)	Use the equal sum concept with numbers up to 1000 as a method to solve addition calculations	Use the equal sum concept with numbers up to 10,000, including units of time and money, as a method to	Apply the equal sum concept to a range of numbers and missing number problems

			with numbers up to 20 e.g.  	e.g.,  Understand the concept of equal difference (subtracting the same quantity from both subtrahend and minuend maintains the difference) with numbers up to 20 e.g.  	solve addition calculations e.g.,  Use equal difference concept with tenths and simple fractions.	(including units of time and money) e.g.,  Use the equal difference concept with a range of numbers, decimals and fractions e.g.
X ÷ by powers of 10				Understand the concept of x and ÷ 10, and use known facts to multiply and divide by 10 and 100 e.g.,  	Understand the concept of x and ÷ 10, and use known facts to multiply and divide by 10, 100 and 1000 e.g., 4000 x 6 4x6=24 x 1000= 24,000 240 ÷ 4 24 ÷ 4 = 6 6 x 10 = 240	X and ÷ by powers of 10, including 2 step problems. Includes decimals e.g.  "I know that 10 million has 8 place values columns and 7 0's. I know that 2 x 5 = 10. This already has one

						0, therefore I could use 2000 x 5000 or 200 x 50,000"
Doubling and halving	Be able to find double of a number (up to 10) using concrete resources e.g.,  Be able to link 'fair sharing' between 2 to the language of 'equal parts' and 'half'	Find doubles up to 20 and link this to repeated addition e.g.,  Understand the link between doubling, halving odds and evens	Find doubles and near doubles with numbers up to 100 e.g.,  Relate repeated addition to multiplication e.g., 3 + 3 = 2 x 3 Be able to generalise what happens when we halve a number that is an odd multiple of 10 e.g., 	Find doubles and near doubles with numbers up to 1000 e.g.,  Use doubling and halving to find unknown products e.g., 	Find doubles and near doubles with numbers up to 10,000. Be able to generalise what happens when we halve a number that is an odd multiple of 100 e.g. "If I halve 700, I can share three hundreds into each group but then I have to regroup the last hundred into ten tens. Each group will then get five tens. So three hundreds and 5 tens in each group is 350." "Where there is an odd multiple of ten or hundred, I will always have to regroup my last ten or hundred into the next place value column down. Then I will share	Use doubling and halving to find unknown products in multiples of 10 e.g., 9 x 200 "I know that 9 x 100 = 900, and 200 is double 100, so to find the product I can double 900 to get 1800."

					halve of that between the two groups which will always be 5 units (5 ones or 5 tens)"	
Rearranging					Rearrange the multiplier and multiplicand using knowledge of doubles and halves to make a calculation more manageable e.g., 4 x 16 =  Can become 8 x 8  	Use the relationship between doubling and halving to manipulate the multiplicand and the multiplier to find more efficient calculations e.g.,  Apply halving and doubling to fractions e.g., Pupils have already secured conceptual understanding of this rule, for example: 5 x 4 = 10 x 2 = 20 x 1 Apply this understanding to fractions, for example: ½ x ¼ = If we double the first term and halve the second, we can transform the calculation to: $1 \times \frac{1}{8} = \frac{1}{8}$

Expectations of recognition at each age group…

EYFS

- Recognise the number 0-20
- Know one more and 1 less for number 0-20

- Know the days of the week in order
- Identify 2D shapes: circle, square, triangle, rectangle, hexagon, pentagon
- Identify 3D shapes: sphere, cylinder, cone, cubes, cuboids

Year 1

- Facts within 10 as above and related subtraction facts
- Know o'clock and half past times
- Know the seasons and months in order
- Identify 3D shapes: pyramids, square based pyramids

Year 2

- Facts within 20 as above and related subtraction facts
- Doubles and halves of numbers to 20
- Multiplication and division facts 2, 5 and 10 x tables
- Multiplication facts for 3 x tables (although this is not covered in more depth until year 3, there have been questions on year 2 SATs covering counting in 3's)
- Know quarter past and quarter to times, as well as intervals of 5
- Number of minutes in an hour; number of hours in a day
- Coin recognition up to £2 and note recognition (Know 100p=£1)
- Identify 2D shapes: quadrilaterals, regular and irregular polygons and identify 3D shapes: cuboids, prisms

Year 3

- Sums and differences between pairs of numbers which are multiples of 10 and 100
- Doubles and halves of multiples of 10 or 100
- Complements of fractions with the same denominator that make 1 e.g. 3/7 + 4/7 = 1
- x 3, x 4, x 8 facts including division facts
- Number of seconds in a minute, number of minutes in an hour, number of hours in a day, number of days in a week
- Number of days in each month and in a year including a leap year

- Recognise right angles, parallel and perpendicular lines and horizontal and vertical lines

Year 4

- Review addition and subtraction facts within 20, ensure application to 10, 100 and 1000 (6 + 3, 60 + 30, 600 + 300, 6000 + 3000)
- Doubles and halves of multiples of 10, 100 or 1000 (6 + 6, 60 + 60, 600 + 600, 6000 + 6000)
- All multiplication and division facts to 12 x 12
- Division and multiplication by 10 and 100
- Conversion of kilometres to metres, hours to minutes, years to months, weeks to days
- Understand tenths and hundredths that make 1
- Read roman numerals to 100
- Know right angles = 90 degrees and types of triangle (isosceles, equilateral, scalene)

Year 5

- Identify prime numbers up to 20 (2, 3, 5, 7, 11, 13, 17, 19)
- Recall metric conversions (1 kilogram = 1000 grams, 1 kilometre = 1000 metres, 1 metre = 100 centimetres, 1 metre = 1000 millimetres, 1 centimetre = 10 millimetres 1 litre = 1000 millilitres)
- Recall square numbers up to 12 squared and their square roots
- Convert between decimals and fractions eg. 1/10=0.1, 1/4=0.25
- Read Roman numerals to 1000
- Know angles on a straight line = 180 degrees, know angles in a triangle = 180 degrees, know angles around a point = 360 degrees

Year 6

- Multiplication and division by zero and one facts
- Convert between decimals, fractions and percentages
- Identify prime numbers up to 50 (2, 3, 5, 7, 11, 13, 17, 19, 23, 27, 29, 31, 37, 41, 43, 47)
- Illustrate and name parts of a circle, including radius, diameter and circumference and know that the diameter is twice the radius.

1/2	0.5	50%
1/4	0.25	25%
3/4	0.75	75%
1/5	0.2	20%
1/10	0.1	10%
2/5	0.4	40%
1/100	0.01	1%
9/100	0.09	9%
21/100	0.21	21%
1/20	0.05	5%