Key Stage 1:

- The principal focus of mathematics teaching in key stage 1 is to ensure that pupils develop confidence and mental fluency with whole numbers, counting and place value. This should involve working with numerals, words and the four operations, including with practical resources (for example, concrete objects and measuring tools).
- By the end of year 2, pupils should know the number bonds to 20 and be precise in using and understanding place value. An emphasis on practice at this early stage will aid fluency.

End of year expectations	Rapid recall	Mental calculation	Language	Using and applying
Year 1	Bonds to 10 1 more or less than a number	Bonds to 20 U + Multiple of 10	Put together Add Altogether Total Take away Difference between More than and less than Equal	Solve simple one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems. E.g. 3 + ? = 14 7 = ? - 11
Year 2	Bonds to 20 Related \pm bonds to 100 with multiples of 10 e.g. 10 - 3 = 7 so $100 - 30 = 70$	TU ± U TU ± Multiple of 10 Adding three one-digit numbers Bonds to 100 with multiples of 10 and 5	Sum Difference Inverse Calculate Partition	Solve simple one-step problems with addition and subtraction using concrete objects and pictorial representations, including those involving numbers, quantities and measures.

Year 1	Concrete	Pictorial	Conceptual	Using & applying
Finding one or	Counting on and back using	Introduce bar models to compare	Introduction to + - and =	5 people were on a
more less.	familiar objects and resources.	quantities.	symbols to create number	bus.
			sentences.	1 more person got
			5 - 1 = 4	on.
			4 + 1 = 5	How many people are
	One more			there altogether ?
			Missing number problems.	
	One less		4 = □ - 1	I have £6.
		_	5 = 🗆 + 1	My brother has £1
		_	$\Box - 1 = 5$	less than me.
			$\Box + 1 = 8$	How much money
				does he have?
				Use the numbers 3 to
				8. How many pairs
				can you find which
		P		have difference of 1?
Use addition as	Counting using familiar	Bar models.	Using number sentences and	I bought 5 sweets.
combining	objects and		beginning to calculate	My friend gave me 4
groups	resources.		mentally.	more.
(aggregation).		1 2 3 4 5 6 7 8 9	7 + 2 = 9	How many do I have
			2 + 7 = 9	in total?
	1, 2, 3, 4 1, 2, 3		9 = 2 + 7	11
			9 = 7 + 2	How many different
	1, 2, 3, 4, 5, 6, 7	n	Missing number problems	additions can find
Addition as	counting using familiar	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Missing number problems. $9 - 2 + \Box$	with a total of 9?
(our counting on	objects and resources.	22222	0 - 3 + 1	
(augmentation).			$9 - \Box + 2$	
			$\begin{array}{c} \mathbf{y} = \mathbf{u} + \mathbf{y} \\ \mathbf{A} = \mathbf{Q}_{-} \mathbf{u} \end{array}$	
			$ \overline{\tau} - 9 4 $	

Year 1	Concrete	Pictorial	Conceptual	Using and applying
Doubling	Using	Using a variety of models and images.	Using number sentences	I had 10 pennies.
and halving	familiar		and beginning to calculate	I gave my friend half of my
numbers	objects and		mentally.	money.
(as repeated	resources.		6+6-	how much do we each
addition and			Double 9 =	nave:
subtraction).			$14 = \text{Double } \dots$	Class 1 has 8 girls.
, , , , , , , , , , , , , , , , , , ,			Half of 18 =	Class 2 has double the
	0		10 = half of	number of girls.
			7 = 14 - □	How many girls are there in
		ë ë ë ë ë ë ë	4 + 🗆 = 8	Class 2?
				How many doubles can you
				find which include the
				number 4?
				E.g. Double 4 = 8
				Double 2 = 4
				Double 7 = 14 etc.
Addition	Using familiar objects and	Using bar models and beginning to look at	Using number sentences	My sister is 17.
and	resources.	number lines.	and calculating mentally.	My brother is 9.
subtraction			13 + 4 = 1/ $1/ = 13 + 44 + 12 = 17$ $17 = 4 = 12$	What is the difference
20	Addition facts		4 + 13 = 17 $17 = 4 = 1317 - 4 = 13$ $13 = 17 - 4$	between their ages?
	Addition facts	Addition and subtraction facts	17 - 13 = 4 $4 = 17 - 13$	Class 1 collected £7 for
		Addition and Subtraction facts		charity. Class 2 collected £8.
			Missing number	If they put their money
			problems.	together, how much would
		0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	$15 = \Box + 6$	they have?
			18 - 🗆 = 4	
	Subtraction facts			The answer is 11.
				How many different ways
				can you use addition or subtraction to solve this?
	Subtraction facts			How many different ways can you use addition or subtraction to solve this?

Year 2	Concrete	Pictorial	Conceptual	Using and applying
Recall and	Using familiar objects and	Using bar models and number lines.	Using number sentences	My foot is 19cm long.
use	resources.		and calculating mentally.	My friend's foot is 14cm long.
addition		Addition and subtraction facts	13 + 4 = 17 $17 = 13 + 4$	Calculate the difference
and	Addition facts		4 + 13 = 17 $17 = 4 + 13$	between the lengths.
subtraction	A ROAD CONTRACTOR OF THE OWNER OF		17 - 4 = 13 $13 = 17 - 4$	
facts to 20		+1 $+1$ $+1$ $+1$ $+1$ $+1$	17 - 13 = 4 $4 = 17 - 13$	How many additions/
fluently				subtractions can you make
aiming to		8 9 10 11 12 13 14	Missing number problems.	with an even/odd answer?
select the	16 B	Jumping in 1s	$15 = \Box + 6$	Which patterns can you see in
most			$18 - \Box = 4$	the numbers you have used?
efficient		+10 +2		
method.	Subtraction facts			
		6 16 18		
		Jumping in 10s and units		
	1217	Jumping in 103 and units		
		Addition and subtraction facts		
		-1 -1 -1 -1 -1		
		12 13 14 15 16 17		
		-2 -10		
		4 6 16		

Year 2	Concrete	Pictorial	Conceptual	Using and applying
Derive	Using familiar objects and	Using 100 squares and number	Using number sentences and	I am thinking of a
and use		lines.	calculating mentally.	number.
related		100 Square	20 + 80 = 100 100 - 80 = 20	If I add 80, the sum is
facts up to	resources.	1 2 3 4 5 6 7 8 9 10	80 + 20 = 100 100 - 20 = 80	100.
100		11 12 13 14 15 16 17 13 19 20 21 22 23 24 25 26 27 28 29 30	100 = 20 + 80 $80 = 100 - 20$	What is my number?
		31 32 33 34 35 36 37 38 39 40	100 = 80 + 20 $20 = 100 - 80$	
		41 42 43 44 49 49 47 49 50 51 52 53 54 55 56 57 58 59 60		How many different
-		61 62 63 64 65 66 67 63 64 70 71 72 73 74 75 76 77 73 79 80		ways can you make £1
		81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100		using 10p, 20p and 50p
	3 + 7 = 10			coins?
	111 111110	+3 +7	Missing number problems.	
			$40 = 100 - \Box$	
	111 111111		$100 - \Box = 70$	
	30 + 70 = 100	0 3 10	50 ₊ □ = 100	
		+30 +70		
		$\langle \rangle \rangle$		
		0 30 100		

Year 2	Concrete	Pictorial	Conceptual	Using and applying
Year 2 TU ± U (without crossing 10s boundary) E.g. 16 ± 3 = TU ± T E.g. 38 ± 20 = TU ± TU (without units	Concrete Using familiar objects and resources. 20 zero ten 20 twenty 23 + 15 25 - 13 24 - 13	Pictorial Bar model images and number lines. Addition and subtraction facts Number lines: +10 $+523$ 33 $38-3$ -1012 15 25	Conceptual Number sentences and calculating mentally. $23 + 15 = 38$ $15 + 23 = 38$ $15 + 23 = 38$ $38 = 23 + 15$ $38 = 15 + 23$ $23 = 38 - 15$ $15 = 38 - 23$ $38 - 15 = 23$ $38 - 23 = 15$ Missing numbers problems. $26 = \Box - 10$ $\Box - 10 = 32$ $\Box + 10 = 51$ $29 = \Box + 10$	Using and applying There are 29 children in Class 3. 13 children have packed lunch and the rest have school dinner. How many children have school dinners? Use the digits 2, 3, 4, and 5. Make two 2 digit numbers. How many different totals are there? Can you make the same total in more than one way?
crossing 10s boundary) E.g. 35 ± 13 =	(Difference images)			

Year 2	Concrete	Pictorial	Conceptual	Using and applying
TU ± U Bridging to 10 E.g. 17 + 8 or 35 – 9	Using familiar objects and resources. $\frac{1}{2ero}$ $\frac{10}{ten}$ $\frac{20}{twenty}$ 16 + 7 as 16 + 4 + 3 $\frac{10}{2ero}$ $\frac{10}{ten}$ $\frac{20}{twenty}$ Or 23 - 7 as 23 - 3 - 4	Bar model images, 100 squares, number lines. 1 2 3 4 5 6 7 8 9 10 $1 2 3 4 5 6 7 8 9 10$ $1 6 + 7 $ by counting to next 10 or 16 - 8 by counting back to ten. 16 + 7 by counting to next 10 or 16 - 8 by counting back to ten. 100 Square 12 2 3 4 5 6 7 8 9 10 $36 40 43$ $-4 -5$ $36 40 43$ $-4 -5$ $36 30 35$	Using number sentences and solving mentally. 36 + 7 = 43 $36 = 43 - 77 + 36 = 43$ $7 = 43 - 3643 - 7 = 36$ $43 = 7 + 3643 - 36 = 7$ $43 = 36 + 7Missing number problems.\Box + 7 = 4343 - \Box = 36\Box - 36 = 7$	(Refer to examples in previous section).

Year 2	Concrete	Pictorial	Conceptual	Using and applying
TU ± TU Expanded methods without crossing 10s or 100s	ConcreteTensUnitsImage: Image: Im	Expanded written methods. 20 + 6 $+ 10 + 3$ $30 + 9 = 39$ $40 + 8$ $- 20 + 5$ $20 + 3 = 23$	Compact written methods. 26 ± 13 39 48 -25 23	Use the digits 2, 3, 4, and 5. Make two 2 digit numbers and find the total. What's the highest/lowest total you can make? Can you make the same total in more than one way? What is the closest total to 70 you make?

Lower Key Stage 2:

- The principal focus of mathematics teaching in lower key stage 2 is to ensure that pupils become increasingly fluent with whole numbers and the four operations, including number facts and the concept of place value. This should ensure that pupils develop efficient written and mental methods and perform calculations accurately with increasingly large whole numbers.
- At this stage, pupils should develop their ability to solve a range of problems, including with simple fractions and decimal place value. By the end of year 4, pupils should have memorised their multiplication tables up to and including the 12 multiplication table and show precision and fluency in their work.

End of year expectations	Rapid recall	Mental calculation	Language	Using and applying
Year 3	Bonds to 100 with multiples of 10 and 5 Bonds to 1000 with multiples of 100	HTU \pm U HTU \pm T HTU \pm T HTU \pm H TU \pm TU by adjusting near multiples of 10 Any bond to 100 e.g. $34 + ? = 100$, or $100 - ? = 27$ <i>Mentally</i> calculate bonds to 1000 with multiples of 50 e.g. $450 + ? = 1000$ or $1000 - ? = 150$ Note taking to round calculations in order to estimate.	Carry Exchange Compact Expanded Boundary Column	Solve problems, including missing number problems, using number facts, place value and more complex addition and subtraction.
Year 4	Bonds to 100 with any 2 digit number Bonds to 1000 with multiples of 50	TU ± TU Bonds to 1000 with multiples of 25	Increase Decrease Tenths Hundredths	Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.

Year 3	Concrete		Pictorial	Conceptual
TU + TU	Tens	Units	Expanded method	NB: TU ± TU should become a mental method; these examples are to help
Expanded			20 + 8	children develop the concept of exchanging and bridging across boundaries
method: crossing tens			<u>+30 + 7</u>	
boundaries <i>keeping</i> the	28 + 37		50 + 15 = 65	
new ten(s) with the units.	NB: combining units but <i>not</i> exchanging for a 10 at this stage.		NB: new ten(s) are kept with the units at this stage.	
	Tens	Units		
	28 + 37			

Year 3	Concrete	Pictorial	Conceptual	Using & applying:
TU + TU Crossing the tens boundary.	Tens Units $28 + 37$ 37 Combining the units and exchanging for a new 10. Tens Units 00000 00000 00000 00000 00000 00000 00000 000000 $28 + 37$	Expanded method crossing the tens boundary. 20 + 8 $+ 30 + 7$ $60 + 5 = 65$ 10	Compact column method. $\begin{array}{r} 28\\ + 37\\ \underline{65}\\ 1\\ \end{array}$ Missing number problems. $32 + 49 = \Box\\ \Box + 73 = 94\\ 16 + \Box = 81\\ \end{array}$	In a car park, there are 28 red cars and 37 blue cars. How many cars are there altogether? Use the digits 3, 4, 5 and 6. Make two 2 digit numbers. What's the highest/lowest total you can make? How can you make the same total in more than one way? What is the closest total to 90 you make?
TU - TU Expanded method with exchanging from the tens to the units.	Tens Units 83 - 54 (Move 54 down to show what's left - exchange a ten for units). Tens Units 0 0 1 1 1 1	Expanded method. 70 80 + 13 -50 + 4 -40 + 7 = 47	Compact column method. 7 9 13 <u>-54</u> <u>47</u> Missing number problems. $85 - 37 = \Box$ $\Box - 26 = 55$ $91 - \Box = 38$	There were 83 cars in a car park. At lunchtime, 54 cars left. How many remained? Choose a 2 digit number between 81 and 99. How many subtractions can you create using your number which have a 4 in the answer? Can you find any patterns?

Year 3	Concrete	Pictorial	Conceptual	
HTU ± TU HTU ± HTU NB: Crossing one boundary only at this stage. (Follow progression shown in TU ± TU)	Hundreds Tens Units Image: Second structure Image: Second structure Image: Second structure 352 + 165 Image: Second structure Image: Second structure 352 + 165 Image: Second structure Image: Second structure 352 + 165 Image: Second structure Image: Second structure 352 + 165 Image: Second structure Image: Second structure 352 - 83 Image: Second structure Image: Second structure 235 - 83 Image: Second structure Image: Second structure (Move 83 down to show what's left - exchange a hundred for tens). Image: Second structure	Expanded methods crossing tens or hundreds boundaries but <i>not</i> both. 300 + 50 + 2 + 100 + 60 + 5 500 + 10 + 7 = 517 100 100 200 + 130 + 5 - 80 + 3 100 + 50 + 2 = 152	Leading to compact column methods and missing number problems crossing tens <i>or</i> hundreds boundaries but <i>not</i> both. 352 + 165 517 1 1 213 5 - 83 152 352 - 165 = 1 - 165 = 517 352 - 1 = 517	Use the digits 1, 2, 3, 4 and 5. Make a 2 digit and a 3 digit number. Add them together. Find ways you can make 168, 483, 339. Use the digits 0, 1, 2, 3 and 4. Make a 3 digit number then reverse the digits. Add your two numbers. Repeat with other examples. What do you notice? Two 3 digit numbers have a difference of 125. The digits of one number add to make 8. What are the numbers? How many ways can you do this?

Year 4	Concrete	Pictorial	Conceptual	Using and applying	
HTU ± HTU Crossing both boundaries.	Follow methods shown in Year 3 using apparatus to cross both boundaries. E.g. 438 + 385 = 624 - 257 =	Expanded methods.	Compact column methods.	My book has 426 pages. I am on page 137. How many more pages do I have to read until I am half way through my book? Use the digits 1 – 9. Choose six of them and make two 3 digit numbers. Find the total/difference. Score a point for every zero you can get in your total.	
HTU - HTU Exchanging through a zero.	Hundreds Tens Units Units Units Units Units Units 304 – 137 (Move 137 down to show what's left – exchange a hundred for tens; then exchange a ten for units).	$304 - 137 =$ $200 90$ $300 + 100 + 14$ $- \frac{100 + 30 + 7}{100 + 60 + 7} = 167$	304 - 137 = 2 9 3 10 14 - <u>1 3 7</u> <u>1 6 7</u>	Use the digits 2 to 8 and make two 3 digit numbers. Find the difference. What's the closest difference you get to400? How many pairs of numbers can you find where the difference is: a 3 digit number with consecutive digits? e.g. 572 – 449 = 123	
ThHTU ± ThHTU	 Follow process shown in Year 3. Addition crossing one boundary. Addition crossing more than one boundary. Subtraction with exchanging through one boundary. Subtraction with exchanging through more than one boundary. Subtraction with exchanging through more than one boundary. Subtraction with exchanging through zero. 	NB: it is expected that children should already be confident with using compact column methods at this stage.	Compact column methods.	I walked 1360m, 2764m and then 2188m. How much further do I have to walk until I have travelled 7 km? Use the following numbers: 2, 2, 3, 4, 4, 5, 7, 7, 8, 8 and 9. Make a pair of 4 digit numbers with a difference of: 1, 10, 100, 1000. How many ways can you do it?	

Year 4	Concrete	Pictorial	Conceptual	Using and applying
U.t ± U.t	Addition without crossing boundaries:	Expanded methods.	Compact column methods and	I ran across the playground in 9.4 seconds My brother was 1.5 seconds
	Units Tenths		missing number	faster than me. My sister was 2.7
			sentences.	seconds slower than my brother.
		2 + 0.3	2.3	How long did my sister take to run
	2.3 + 1.5	+1+0.5	<u>+ 1.5</u>	across the playground?
		$\frac{3}{3+0.8} = 3.8$	<u> 3.8</u>	Use the digits 0 to 9. Make two
	Exchanging tenths for a new unit:			decimals (units and tenths). Add them
	Units Tenths		1.7	together. How many pairs can you
			+ 2.5	make with a total of 10?
		1 + 0.7	4.2	
		+2+0.5	1	
	1.7 + 2.5	4 + 0.2 = 4.2	1	
	Subtraction without crossing boundaries:	1		
	Units Tenths			
			2.6	
		3 + 0.6	3.0	
		<u>- 2 + 0.1</u>	<u>-2.1</u>	
	3.6 – 2.1 (Move 2.1 down to show what's	1 + 0.5 = 1.5	<u> 1.5</u>	
	Exchanging a unit for tenths.	2 1.4	2	
	Units Tenths	3 + 0.4	3.14	
		$\frac{-1+0.7}{1+0.7-1.7}$	<u>-1.7</u>	
		1 + 0.7 - 1.7	<u>1.7</u>	
	$24 \cdot 17$ (Mayo 17 down to charge whether		[57 - 10]	
	left).		3.7 - 1 - 1.0 1 + 4.9 = 7.2	
			□ - 3.6 = 1.5	

Year 4	Concrete			Pictorial	Conceptual	Using and applying	
U.th ± U.th	Units	Tenths	Hundredths	Expanded methods to develop concepts of place value with hundredths.	Compact column methods.	Any 2 books cost £8.00 in a sale. The price of my books would have been £3.89 and £5.75 before the sale. How much money did I save by buying the books in the sale?	
	Develop proce Additi Additi bound Subtra throug Subtra throug Subtra throug	ess shown in U on crossing on on crossing ma ary. action with exc gh one boundat action with exc gh more than o action with exc gh zero.	t ± U.t e boundary. ore than one hanging ry. hanging ne boundary. hanging			Use the digits 1 to 9. Make 3 decimals (units tenths and hundredths) and subtract them from 20. What's the closest answer to zero you can make? Use the digits 1 to 9. Make 2 decimals (unit, tenths and hundredths). Find the difference. How many differences can you find which equal 1.23?	

<u>Upper Key Stage 2:</u>

- The principal focus of mathematics teaching in upper key stage 2 is to ensure that pupils extend their understanding of the number system and place value to include larger integers. This should develop the connections that pupils make between multiplication and division with fractions, decimals, percentages and ratio.
- At this stage, pupils should develop their ability to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic, and problems demanding efficient written and mental methods of calculation. With this foundation in arithmetic, pupils are introduced to the language of algebra as a means for solving a variety of problems.
- By the end of year 6, pupils should be fluent in written methods for all four operations, including long multiplication and division, and in working with fractions, decimals and percentages.

End of year expectations	Rapid recall	Mental calculation	Language	Using and applying
Year 5	Decimal bonds to 1	Add and subtract numbers mentally with increasingly large numbers (for example, 12	Thousandths	Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.
	d.p. to any whole	462 - 2300 = 10 162).		
	number e.g. 3 6 un to 11	Rounding to check answers to calculations and determine in the context of a problem levels		
	0.0 up to 11.	of accuracy.		
Year 6		Perform mental calculations, including with		Use their knowledge of the order of operations to carry out
		700 + 115 =		Solve addition and subtraction multi-step. Problems in contexts,
		Rounding to check answers to calculations and		deciding which operations and methods to use and why Solve problems involving addition, subtraction, multiplication
		determine, in the context of a problem, levels of accuracy		and division including interpreting remainders appropriately to the context of the problem.
				r i i i i i r i i r

Year 5	 Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction). Add and subtract decimals values up to thousandths. 	I travelled to 3 different cities. The distances of my journeys were: 1982 m, 15642 m and 12108m. What was the total distance travelled in metres? How far did I travel in km? My friend travelled 31.9km, how much further did he travel than
Year 6	 (Refer to process in Year 3 and 4. Children should be able to use column methods efficiently to work at this level). Use their knowledge of the order of operations to carry out calculations involving the four operations Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why. 	 me? Use the digits 3, 4, 6 and 7. Make a 4 digit number and subtract it from 10,000. What are the largest and smallest answers? Which answer is closest to 5000? Find the digital roots of your answers. What do you notice? Use the digits 1 to 9. Make a 4 digit and a 5 digit number. Find the difference. Which pairs of numbers give you an answer closest to80000, 75000, 70000 etc? Use the digits 1 to 9. Make 2 decimals (unit, tenths, hundredths and thousandths). Find the difference. How many differences can you find which equal 1.234? Use the digits 0 to 7. Make two decimals (units, tenths, hundredths and thousandths). Add them and find the nearest whole number to your answer. How many totals can you find where the nearest whole numbers is4, 5, 12? Etc.