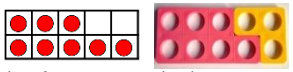
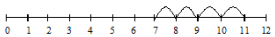
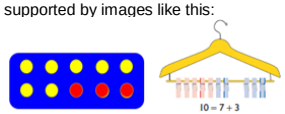
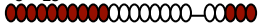
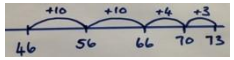
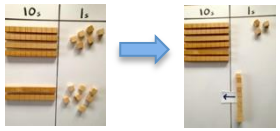
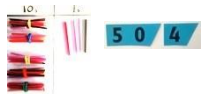
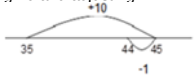
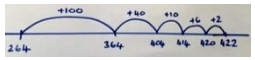
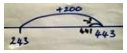
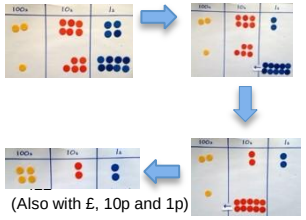
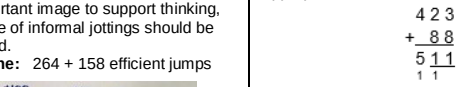
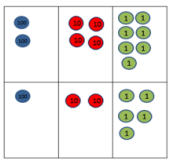
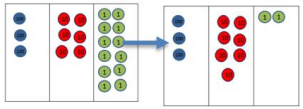
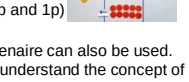
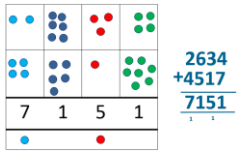
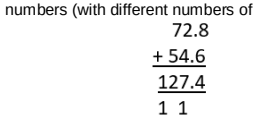
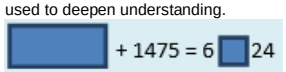
Addition

Year	1	2	3	4	5	6
Written Methods: Developing conceptual understanding	**+ = signs and missing numbers** Children need to understand the concept of equality before using the '=' sign. Number bonds  (Ten frame Numicon) Use bonds to 10 to calculate bonds to 20.  Count all  Count on  Count on, on number track, in 1s  Understanding of counting on with a numberline (supported by models and images). 7+ 4  Represent & use number bonds and related subtraction facts within 20 They should see addition and subtraction as related operations. E.g. 7 + 3 = 10 is related to 10 – 3 = 7, understanding of which could be supported by images like this:  Use bundles of straws, Dienes, Cuisenaire and Numicon to model partitioning teen numbers into tens and ones and develop understanding of place value.	Use practical and informal written methods to support addition and subtraction of two-digit numbers They should continue to see addition as both combining groups and counting on. Number track / Number line – jumps of 1 then efficient jumps using number bonds 18 + 5 = 23  46 + 27 = 73 Count in tens then bridge.  25 + 29 by + 30 then -1 (Round and adjust)  Partition and recombine 46 + 27 = 60 + 13 = 73  24 +10 +10 +10 = 54  100 squares could be used to explore patterns in calculations such as 74 +11, 77 + 9 encouraging children to think about 'What do you notice?' where partitioning or adjusting is used. **Number lines** should continue to be an important image to support mathematical thinking, for example to model how to add 9 by adding 10 and adjusting. 	Add and subtract numbers with up to three digits using informal written methods with increasing efficiency. The number line should continue to be used as an important image to support thinking, and the use of informal jottings should be encouraged. **Number line:** 264 + 158 efficient jumps  40 + 80 = 120 using 4 + 8 = 12 So 400 + 800 = 1200 243 + 198 by +200 then -2 (Round and adjust)  Pairs that make 100 23 + 77  Place value counters, 100s, 10s, 1s 264 + 158  (Also with £, 10p and 1p) Dienes and Cuisenaire can also be used. Children start to understand the concept of regrouping e.g. 12 ones = 1 ten and 2 ones.	Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction where appropriate.  Towards a Written Method Introduce expanded column addition modelled with place value counters, Cuisenaire or Dienes.  200 + 40 + 7 100 + 20 + 5 300 + 60 +12 = 372 247 +125 12 60 300 372 Leading to children understanding the regrouping of ones to tens.  When children are confident, introduce the formal columnar algorithm, initially alongside the expanded method. The formal method should be seen as a more streamlined version of the expanded method, not a new method.  Children should be able to make the choice of reverting to expanded methods if experiencing any difficulty. The number line should continue to be used as an important image to support thinking, and the use of informal jottings should be encouraged where appropriate.	**Compact written method** Extend to numbers with at least four digits.  Children should be able to make the choice of reverting to expanded methods if experiencing any difficulty. Extend to up to two places of decimals (same number of decimals places) and adding several numbers (with different numbers of digits). 	Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why. **Written method** As year 5, progressing to larger numbers, aiming for both conceptual understanding and procedural fluency with columnar method to be secured. Continue calculating with decimals, including those with different numbers of decimal places.
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. **Missing numbers** need to be placed in all possible places. 3 + 4 = □ □ = 3 + 4 3 + □ = 7 7 = □ + 4 Practical resources (e.g. Numicon)can be used to support understanding. Calculations should be written either side of the equality sign so that the sign is not just interpreted as 'the answer. 2 = 1+ 1 2 + 3 = 4 + 1 **Missing symbols** Write the missing symbols (+ - =) in these number sentences: 17 □ 3 □ 20 18 □ 20 □ 2	Add numbers using concrete objects, pictorial representations, and mentally, including: * a two-digit number and ones * a two-digit number and tens * two two-digit numbers * adding three one-digit numbers **Counting** Children should count regularly, on and back, in steps of 2, 3, 5 and 10. Counting forwards in tens from any number should lead to adding multiples of 10 **Missing numbers** They should use concrete objects such as bead strings and number lines to explore missing numbers: 45 + __ = 50. □+ □ + □ = 14 What single digit numbers could go in the boxes? How many different ways can you do this?	Add numbers mentally, including: * a three-digit number and ones * a three-digit number and tens * a three-digit number and hundreds **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/digit problems** should also be used to deepen understanding. Children should continue to partition numbers in different ways. They should be encouraged to choose the mental strategies which are most efficient for the numbers involved, e.g. • Add the nearest multiple of 10, then adjust such as 63 + 29 is the same as 63 + 30 – 1; • Counting on by partitioning the second number only such as 72 + 31 = 72 + 30 + 1 = 102 + 1 = 103 Manipulatives can be used to support mental	**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/digit problems**: should be used to deepen understanding. Children should continue to **partition** numbers in different ways. They should be encouraged to **choose** from a range of strategies: •Counting forwards and backwards: 124 – 47, count back 40 from 124, then 4 to 80, then 3 to 77 •Reordering: 28 + 75, 75 + 28 (thinking of 28 as 25 + 3) •Partitioning: counting on or back: 5.6 + 3.7, 5.6 + 3 + 0.7 = 8.6 + 0.7 •Partitioning: bridging through multiples of 10: 6070 – 4987, 4987 + 13 + 1000 + 70 •Partitioning: compensating – 138 + 69, 138 + 70 - 1	**Counting** Children should continue to count regularly, on and back, now including steps of powers of 10. **Missing number/digit problems** should also be used to deepen understanding.  What is the largest possible number that will go in the larger box? What is the smallest? Convince me. Children should practise with increasingly large numbers to aid fluency e.g. 12462 + 2300 = 14762 **Hard and easy questions** Which questions are easy / hard? 213323 - 70 = ; 512893 + 300 = 819354 - 500 = ; 319954 + 100 = Explain why you think the hard questions are hard? Children should continue to partition numbers in	Perform mental calculations, including with mixed operations and large numbers. **Missing number/digit problems:** 6.32 + □ = 8 + □ = 9.68 Three four digit numbers total 12435. What could they be? **Missing symbols** Write the missing signs (+ - x ÷) in this number sentence: 6□ 12.3 = 61.9 □11.9 Children should experiment with order of operations,

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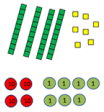
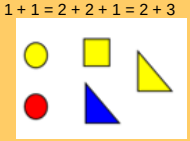
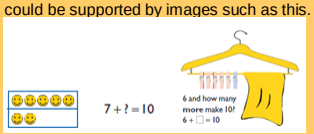
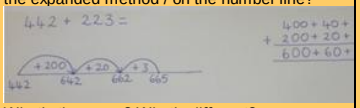
	Children explore **partitioning** numbers in different ways. e.g. 7 = 6 + 1, 7 = 5 + 2, 7 = 4 + 3 =; 8 + 3 = 8 + 2 + 1 Add near doubles e.g. 5+6 = 5+5+1 Add one-digit and two-digit numbers to 20, including zero. **Continue the pattern** 10 + 8 = 18 11 + 7 = 18 Can you make up a similar pattern for the number 17? How would this pattern look if it included subtraction? **Making an estimate** Pick (from a selection of number sentences) the ones where the answer is 8 or 9	**Missing symbols** Write the missing symbols (+ - =) in these number sentences: 80 □ 20 □ 100 100 □ 70 □ 30 87 □ 13 □ 100 Children should use Dienes, Cuisenaire, Numicon etc. to model **partitioning** into tens and ones and learn to partition numbers in different ways e.g. 23 = 20 + 3 = 10 + 13. **Hard and easy questions** Which questions are easy / hard? 23 + 10 = 93 + 10 = 54 + 9 = 54 + 1 = Explain why you think the hard questions are hard?	imagery and conceptual understanding. Children need to be shown how these images are related e.g. **What's the same? What's different?**  **Hard and easy questions** Which questions are easy / hard? 323 + 10 = 393 + 10 = 454 - 100 = 954 - 120 = Explain why you think the hard questions are hard?	•Partitioning: using 'near' doubles: 160 + 170 is double 150, then add 10, then add 20, or double 160 and add 10, or double 170 and subtract 10 •Partitioning: bridging through 60 to calculate a time interval – What was the time 33 minutes before 2.15pm? •Using known facts and place value to find related facts. **Hard and easy questions** Which questions are easy / hard? 13323 - 70 = 12893 + 300 = 19354 - 500 = 19954 + 100 = Explain why you think the hard questions are hard? **True or false?** Are these number sentences true or false? 6.7 + 0.4 = 6.11 ; 8.1 – 0.9 = 7.2 Give your reasons.	different ways. They should be encouraged to choose from a range of strategies: •Counting forwards and backwards in tenths and hundredths: 1.7 + 0.55 •Reordering: 4.7 + 5.6 – 0.7, 4.7 – 0.7 + 5.6 = 4 + 5.6 •Partitioning: counting on or back - 540 + 280, 540 + 200 + 80 •Partitioning: bridging through multiples of 10 •Partitioning: compensating: 5.7 + 3.9, 5.7 + 4.0 – 0.1 •Partitioning: using 'near' double: 2.5 + 2.6 is double 2.5 and add 0.1 or double 2.6 and subtract 0.1 •Partitioning: bridging through 60 to calculate a time interval: It is 11.45. How many hours and minutes is it to 15.20? •Using known facts and place value to find related facts.	investigating the effect of positioning the brackets in different places, e.g. 20 – 5 x 3 = 5; (20 – 5) x 3 = 45 **Hard and easy questions** Which questions are easy / hard? 213323 - 70 = 512893 + 37 = 8193.54 - 5.9 = Explain why you think the hard questions are hard? **What else do you know?** If you know this: 86.7 + 13.3 = 100 what other facts do you know?
Just know it!	**Achieve all bronzes on their number bond card.**	Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 e.g. using 7 + 3 = 10 to find 17 + 3= 20, 70 + 30 = 100. **Achieve all silvers and golds on their number bond card.**				
Vocabulary	Addition, add, forwards, put together, more than, total, altogether, distance between, difference between, equals = same as, most, pattern, odd, even, digit, counting on.	+, add, addition, more, plus, make, sum, total, altogether, how many more to make…? how many more is… than…? how much more is…? =, equals, sign, is the same as, Tens, ones, partition Near multiple of 10, tens boundary, More than, one more, two more… ten more… one hundred more	Hundreds, tens, ones, estimate, partition, recombine, difference, decrease, near multiple of 10 and 100, inverse, rounding, column subtraction, exchange See also Y1 and Y2	add, addition, sum, more, plus, increase, sum, total, altogether, double, near double, how many more to make..? how much more? Ones boundary, tens boundary, hundreds boundary, thousands boundary, tenths boundary, hundredths boundary, inverse, how many more/fewer? Equals sign, is the same as.	tens of thousands boundary, Also see previous years	See previous years
Reasoning	• True or false? Addition makes numbers bigger. • Is it true that? Is it true that 3+4 = 4 + 3? • Children could see the image below and consider, "What can you see here?" e.g. 3 yellow, 1 red, 1 blue. 3 + 1 + 1 = 5 2 circles, 2 triangles, 1 square. 2 + 2 + 1 = 5 I see 2 shapes with curved lines and 3 with straight lines. 5 = 2 + 3 5 = 3 + 1 + 1 = 2 + 2 + 1 = 2 + 3 	• Noticing what happens when you count in tens (the digits in the ones column stay the same) • Odd + odd = even; odd + even = odd; etc • show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot • Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and missing number problems. This understanding could be supported by images such as this. 	• Noticing what happens to the digits when you count in tens and hundreds. • Odd + odd = even etc (see Year 2) • Inverses and related facts – develop fluency in finding related addition and subtraction facts. • Develop the knowledge that the inverse relationship can be used as a checking method. •  The total is 201. Each missing digit is either a 9 or a 1. Write in the missing digits. Is there only one way of doing this or lots of ways? Convince me. • Is it always, sometimes or never true that when you add two numbers together you will get an even number?	• Investigate when re-ordering works as a strategy e.g 7+ 16 + 3 = 7+3+16	Sometimes, always or never true? The difference between a number and its reverse will be a multiple of 9. What do you notice about the differences between consecutive square numbers? Investigate a – b = (a-1) – (b-1) represented visually.	Order of operations: brackets first, then multiplication and division (left to right) before addition and subtraction (left to right). Children could learn an acrostic such as BODMAS, or could be encouraged to design their own ways of remembering. Sometimes, always or never true? Subtracting numbers makes them smaller.
Key Questions	How many altogether? How many more to make…? I add …more. What is the total? How many more is… than…? How much more is…? One more, two more, ten more… What can you see here? Is this true or false? What is the same? What is different?	How many altogether? How many more to make…? How many more is… than…? How much more is…? Is this true or false? If I know that 17 + 2 = 19, what else do I know? (e.g. 2 + 17 = 19; 19 – 17 = 2; 19 – 2 = 17; 190 – 20 = 170 etc). What do you notice? What patterns can you see?	What do you notice? What patterns can you see? When comparing two methods alongside each other: What's the same? What's different?	What do you notice? E.g. look at this number in the formal method; can you see where it is in the expanded method / on the number line?  What's the same? What's different? Can you convince me? How do you know?	What do you notice? What's the same? What's different? Can you convince me? How do you know?	What do you notice? What's the same? What's different? Can you convince me? How do you know?
Half termly focus for starters	1 more	10 more Number bonds: 20, 12, 13	Add multiples of 10 and 100 to any three-digit number including those that are not multiples of 10.	Add multiples of 10s, 100s, 1000s	Add multiples and near multiples of 10s, 100s, 1000s, tenths (hundredths Yr6) See previous years. Also add multiples of hundredths	
	Number bonds: 5, 6	Number bonds: 14,15 Add 1 digit to 2 digit by bridging.	Add single digit bridging through boundaries	Fluency of 2 digit + 2 digit; know what must be added to any 3-digit number to make the next multiple of 100 e.g. 521 + = 600	Fluency of 2 digit + 2 digit, including with decimals Know what must be added to 4-digit number to make the next multiple of 1000 e.g. 4087+□=5000	

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	Largest number first. Number bonds: 7, 8	Partition second number, add tens then ones	Partition second number to add Pairs to 100 e.g. 32+68	Partition second number to add Decimal pairs of 10 and 1	Partition second number to add	
	Add 10. Number bonds: 9, 10	Add 10 and multiples. Number bonds: 16 and 17	Use near doubles to add e.g. 18+16, 60+70	Use near doubles to add, including when adding decimals	Use number facts, bridging and place value	
	Ten plus ones. Doubles for numbers up to 10 (e.g. 8+8=16)	Doubles up to 20 and multiples of 5 Add near multiples of 10	Add near multiples of 10 and 100 by rounding and adjusting	Adjust both numbers before adding Add near multiples	Adjust numbers to add ; what must be added to a decimal with units and tenths to make the next whole number e.g. 7.2 + □ = 8	
	Use number bonds of 10 to derive bonds of 11	Number bonds: 18, 19 Partition and recombine	Partition and recombine	Partition and recombine	Partition and recombine	