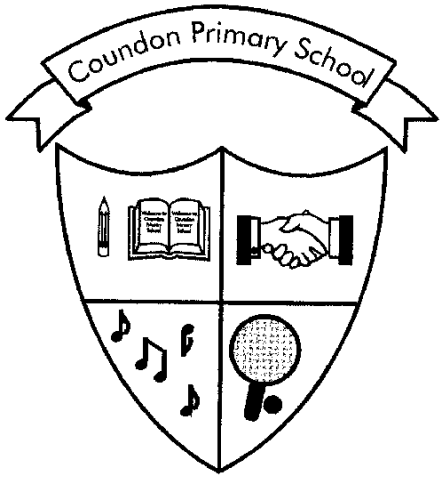
COUNDON PRIMARY SCHOOL
POLICY BOOKLET



MATHEMATICS
ROUTES THROUGH MENTAL AND WRITTEN CALCULATION
September 2023

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Date of approval	
Signed by Chair of Governors	
Signed by Head teacher	
Review Date	September 2025 or earlier if required.

The 2014 National Curriculum highlights:

Aims

The national Curriculum for mathematics aims to ensure that all pupils:

- become **fluent** in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils have conceptual understanding and are able to recall and apply their knowledge rapidly and accurately to problems.
- **reason** mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language.
- can **solve problems** by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

The expectation is that the majority of pupils will move through the programmes of study at broadly the same pace. However, decisions about when to progress should always be based on the security of pupil's understanding and their readiness to progress to the next stage. Pupils who grasp rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content. Those who are not sufficiently fluent with earlier material, should consolidate their understanding, including through additional practice, before moving on.

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 practical resources (e.g. 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.

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.

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.

Upper Key Stage 2

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.

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.

Mental methods for ADDITION

EYFS

- Story around structure – I have a set of 3 objects to start with and I get 5 more *'How many altogether?'*
- Often modelled with sets of 'things' – essentially the story follows the same plot of 'have', 'more', 'altogether'
- Lots of songs and rhymes.
- Very practical
- Using language e.g. put altogether, add altogether, total, more than

Year 1

National Curriculum statutory	Examples	Mental strategies
• add and subtract one-digit and two-digit numbers to 20 including zero. • represent and use number bonds and related subtraction facts within 20. • pupils memorise and reason with number bonds to 10 and 20 in several forms (e.g. 9+7 = 16, 16-7=9; 7 = 16-9) • they should realise the effect of adding or subtracting zero.	**Add two single-digit numbers** e.g. 3 + 5, 6 + ☐ = 9 **Add two single-digit numbers** e.g. 8 + 6, 5 + ☐ = 12 **Add a 'teens' number and ones** e.g. 13 + 5, ☐ + 3 = 17 **Also include:** **Adding zero** e.g. 3 + 0, 15 + 0, 0 + ☐ = 5	• count on in ones; • 1 more than a number; • 10 more than a multiple of 10; • add by counting on from the larger number; • reorder numbers in a calculation; • look for pairs that make 10; • look for doubles and near doubles; • begin to bridge through 10 when adding a single-digit number; • use know facts and place value to add pairs of single-digit numbers; • partition and recombine by breaking units of 7, 7 8 or 9 into '5 and a bit' • use patterns of similar calculations.

Year 2

National Curriculum statutory	Examples	Mental Strategies
• add and subtract 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 • recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100.	**Add three single-digit numbers** e.g. 6 + 8 + 4, 6 + 3 + 6, 8 + 9 + 7 • Using number bonds to 10 3 + 6 + 4 = 6 + 4 = 10 + 3 = 13 • Also look for doubles e.g. 4+4 =8 etc **Add a 2-digit number and ones** e.g. 43 + 5, 31 + ☐ = 38 **Add a 2-digit number and tens** e.g.23 + 40, 47 + ☐ = 77 **Add pairs of 2-digit numbers** e.g. 41 + 32, 31 + ☐ = 54	• count on in tens and ones; • reorder numbers in a calculation; • add three 1 digit numbers; put the largest number first, using know facts (pairs to 10, doubles) • add by partitioning into tens and units and then recombine; 35 + 23 = 30 + 5 + 20 + 3 = 30 + 20 + 5 + 3 = 50 + 8 = 58 • bridge through multiples of 10; • use number facts and place value to add pairs of numbers; • add 9, 19, 11 or 21 by rounding and compensating; • use patterns of similar calculations.

Year 3

National Curriculum statutory	Examples	Mental Strategies
• add and subtract numbers mentally, including: - a three-digit number and ones - a three-digit number and tens - a three-digit number and hundreds	**Add a 3-digit number and ones** e.g. 231 + 6, 241 + ☐ = 248 **Add a 3-digit number and tens** e.g. 249 + 50, 431 + ☐ = 471 **Add a 3-digt number and hundreds** e.g. 381 + 400, 231 + ☐ = 531 **Also include:** **Adding pairs of 2-digit numbers** e.g. 72 + 41, 87 + ☐ = 121 **Adding to any 3-digit number to make the next ten or hundred** e.g. 247 + ☐ = 250 **Add three small numbers** e.g. 13 + 8 + 7, 8 + 13 + 8, 8 + 15 + 17	• count on in hundreds, tens or ones; • add mentally a 'near multiple of 10' • add 3 or 4 small numbers • partition into hundreds, tens and ones and in different ways, then recombine (724 = 700 + 20 + 4) (724 = 600 + 110 + 14) • reorder numbers in a calculation • bridge through a multiple of 10, then adjust; • use known facts and place value to add; • use patterns of similar calculations; • use the relationship between addition and subtraction.

Year 4

National Curriculum statutory	Examples	Mental strategies
• Pupils continue to practise mental calculation strategies …addition and subtraction with increasingly large numbers to aid fluency.	**Add a 4-digit number and ones** e.g. 4312 + 6, 3441 + ☐ = 3443 **Add a 4-digit number and tens** e.g. 1735 + 40, 2143 + ☐ = 2193 **Add a 4-digt number and hundreds** e.g. 2175 + 400, 3248 + ☐ = 3948 **Add a 4-digit number and thousands** e.g. 1367 + 4000, 5648 + ☐ = 7648 **Also include:** **Adding a 2-digit number to a 3-digit tens** e.g. 430 + 54, 610 + ☐ = 637 **Adding any pair 3-digit numbers to a multiple of 10** e.g. 430 +260 **Adding to any 3 digit number make the next multiple of 1000** e.g. 370 + ☐ = 1000	• count in steps of 1, 10, 100 or 1000; • reorder numbers in a calculation • add 3 or 4 small numbers • partition, adding the most significant digit first; • use known facts and place value to add; • add the nearest multiple of 10 or 100 and then adjust; • use the relationship between addition and subtraction.

Year 5

National Curriculum statutory	Examples	Mental strategies
• add and subtract numbers mentally with increasingly large numbers • practise mental calculations with increasingly large numbers (e.g. 12642 – 2300 = 10 162) • mentally add and subtract tenths, and one-digit numbers and tenths. • Calculate complements to 1 (0.83 + 0.17 = 1)	**Add tenths to a 1-digit whole number and tenths** e.g. 5.4 + 0.3, 4.3 + ☐ = 4.9 **Add two 1-digit whole numbers and tenths** e.g. 5,4 + 2.5, 2.4 + ☐ = 7.6 **Also include:** **Adding a 4-digit multiple of 100 to a 5-digit number** e.g. 32 634 + 2100, 18 521 + 7 100 **Adding to a decimal fraction with units and tenths to make the next whole number** e.g. 4.3 + ☐ = 5 **Adding any pair of 3-digit multiples of 10** e.g. 390 + 340, ☐ + 350 = 810 **Add two numbers with tenths and hundredths** e.g. 0.57 + 0.32, 0.48 + 0.69	• count in steps of 0.1, 1, 10, 100 or 1000; • reorder numbers in a calculation • partition, adding the most significant digit first; • use know facts and place value to add • add the nearest multiple of 1, 10, or 100 then adjust; • develop further the relationship between addition and subtraction.

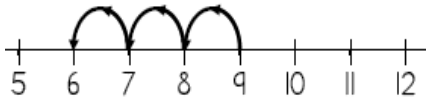
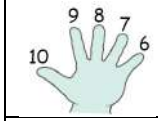
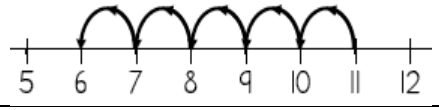
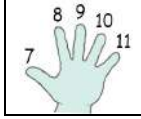
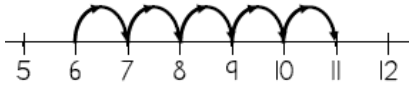
Year 6

National Curriculum statutory	Examples	Mental strategies
• They undertake mental calculations with increasingly large numbers and more complex calculations.	**Add large numbers** e.g. 129 000 + 34 000 **Add negative numbers in context** e.g. rise from -3°C by 1°C **Also include:** **Adding several 1-digit whole numbers and tenths** e.g. 2.3 + 5.7 + 3.9 **Adding decimals with different numbers of places** e.g. 0.5 + ☐ = 0.87, 0.67 + 0.2 **Adding to any number with 2 decimal places to make the next tenth or whole** e.g. 3.65 + ☐ = 4 **Adding any pair of 4-digit multiples of 100** e.g. 5700 + 2500, 2400 + 8700	• consolidate all strategies from previous years; • partition, adding the most significant digit first; • use known facts and place value to add • add the nearest multiple of 0.1, 10, 100 or 1000, then adjust; • continue to use the relationship between addition and subtraction.

Mental methods for SUBTRACTION

EYFS

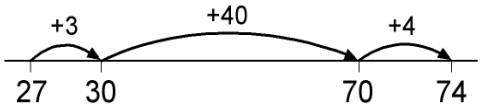
- Story around structure – I have a set of 6 objects to start with and so many of them get partitioned off, taken away, eaten, lost… *'How many are left?'*
- Often modelled with sets of 'things' – essentially the story follows the same plot of 'have', 'take away', 'have left'
- Lots of songs and rhymes.
- Very practical.
- Using language e.g. take away, distance between, difference between and less than

Early skills
Count out - a child finding 9 - 3, gets 9 objects and takes away 3, counts how many remain. 
Count back from - a child finding 9 - 3, counts back three numbers from 9: *'eight, seven, six'.* 
Count back to - a child doing 11 - 6, counts back from the first number to the second, keeping a tally using fingers of the number of numbers that have been said, *'ten, nine, eight, seven, six'*, holding up five fingers.  
Count up - a child doing 11 - 6, counts up from 6 to 11, *'seven, eight, nine, ten, eleven'*, sometimes keeping a count of the spoken numbers using fingers.  

Year 1

National Curriculum statutory	Examples	Mental strategies
• **add and subtract one-digit and two-digit numbers to 20 including zero.** • **represent and use number bonds and related subtraction facts within 20.** • **pupils memorise and reason with number bonds to 10 and 20 in several forms (e.g. 9+7 = 16, 16-7=9; 7 = 16-9)** • **they should realise the effect of adding or subtracting zero.**	**Subtract a small number from a single digit number** e.g. 9 – 2 , 8 - ☐ = 7 **Subtract two single-digit numbers (small difference)** e.g. 8 - 6, 9 - ☐ = 6 **Subtract a ones from a 'teens' number** e.g. 16 - 5, ☐ - 3 = 11 **Also include:** **Subtracting zero** e.g. 3 - 0, 15 - 0 **Subtracting ones from 10 or 20** e.g. 10 – 4, 10 - ☐ = 2	• count back in ones; • 1 less than a number; • 10 less than a multiple of 10; • take away a small number by counting back; • begin to bridge through 10, when subtracting a single-digit number; • use know facts and place value to subtract a single-digit number; • use patterns of similar calculations.

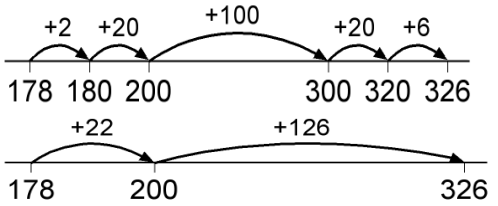
Year 2

National Curriculum statutory	Examples	Mental strategies
• add and subtract 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 • recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100.	**Subtract ones from a 2-digit number** e.g. 48 – 5, 36 - ☐ = 31 **Subtract tens from a 2-digit number** e.g. 73 - 30, 51 - ☐ = 21 **Subtract pairs of 2-digit numbers** e.g. 47 - 22, 85 - ☐ = 54 **Also include:** **Subtracting pairs of 2-digit numbers (difference less than 10)** e.g. 47- 42, 71 - ☐ = 68 **Subtracting ones from a tens number** e.g. 30 – 4, 70 - ☐ = 68 **Subtract tens from a tens number** e.g. 80 – 40, 70 - ☐ = 61	• count back in tens and ones; Where no boundary is crossed Where a boundary is crossed E.g. 58 –23 = 58 – 20 – 3 E.g. 53 –28 = 53 – 20 = 38 – 3 = 33 – 8 = 3= 25 • counting on  • subtract mentally a 'near multiple of 10'; • take away a small difference by counting back; • find a small difference by counting up from the smaller to the larger number. • bridge through a multiple of 10 and adjust; • use number facts and place value to subtract pairs of numbers; • subtract by partitioning second number and subtracting tens then units

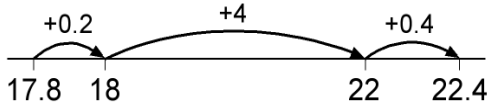
Year 3

National Curriculum statutory	Examples	Mental strategies
• add and subtract numbers mentally, including: - a three-digit number and ones - a three-digit number and tens - a three-digit number and hundreds	**Subtract ones from a 3-digit number** e.g. 237 - 6, 258 - = 2☐ **Subtract tens from a 3-digit number** e.g. 475 - 40 + 50, 581 - ☐ = 531 **Subtract hundreds from a 3-digit number** e.g. 981 - 400, 231 - ☐ = 131 **Also include:** **Subtracting pairs of 3-digit numbers (difference less than 10)** e.g. 458 - 451, 603 - 597 **Subtracting ones from a 3-digit number** e.g. 280 -5, 500 - ☐ = 497 **Subtract a 2-digit number from a one hundred 3-digit number** e.g. 13 127 – 72, 143 - 86	• count back in hundreds, tens or ones; • subtract mentally a 'near multiple of 10' • find a small difference by counting up from the smaller to the larger number; • bridge through a multiple of 10, then adjust; • use knowledge of number facts and place value to subtract pairs of numbers; • subtract a 2-digit number by partitioning it – subtracting its tens then ones • use patterns of similar calculations; • use the relationship between addition and subtraction.

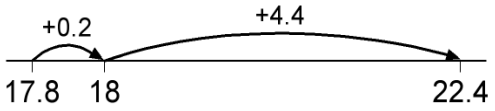
Year 4

National Curriculum statutory	Examples	Mental strategies
• Pupils continue to practise mental calculation strategies …addition and subtraction with increasingly large numbers to aid fluency.	**Subtract ones from a 4-digit number** e.g. 4319 - 6, 3486 - ☐ = 3481 **Subtract tens from a 4-digit number** e.g. 1375 - 40, 5163 + ☐ = 5113 **Subtract hundreds from a 4-digit number** e.g. 5629 - 400, 4648 - ☐ = 4148 **Subtract a 4-digit number and thousands** e.g. 6173 - 4000, 4648 + ☐ = 4148 **Also include:** **Subtract 3-digit multiple of 10 from a 3-digit number** e.g. 742 - 210, 516 - ☐ = 146 **Subtract 3-digit multiple of ten from a thousands number** e.g. 3000 – 230, 7000 - ☐ = 6480 **Subtract a pair of numbers lying either side of a thousands** e.g. 7003 – 6988, 6004 - ☐ = 19	• count back in steps of 1, 10, 100 or 1000; • find a difference by counting up through the next multiple of 10, 100 or 1000 • use known facts and place value to subtract; • subtract the nearest multiple of 10 or 100 and then adjust; • use the relationship between addition and subtraction. 

Year 5

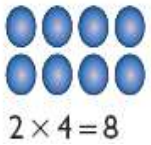
National Curriculum statutory	Examples	Mental strategies
• add and subtract numbers mentally with increasingly large numbers • practise mental calculations with increasingly large numbers (e.g. 12642 – 2300 = 10 162) • mentally add and subtract tenths, and one-digit numbers and tenths. • Calculate complements to 1 (0.83 + 0.17 = 1)	**Subtract tenths to a 1-digit whole number and tenths** e.g. 5.4 - 0.3, 42.6 - ☐ = 3.9 **Subtract two 1-digit whole numbers and tenths** e.g. 5.4 -2.5, 8.2 - ☐ = 1.6 **Subtract 4-digit multiple of 100 from a 5-digit number** e.g. 25 935 – 2 100 **Also include:** **Subtract two near multiples of thousands** e.g. 5001 – 1997, 8006 - 2993 **Subtract two numbers with tenths and hundredths** e.g. 0.57 – 0.32, 0.64 - ☐ = 0.37 **Subtract a 1-digit whole number and tenths from a whole number** e.g. 7 – 5.3, 12 – 7.6	• count in steps of 0.1, 1, 10, 100 or 1000; • use know facts and place value to subtract; • find a small difference by counting up through the next multiple of 10, 100 or 1000. • subtract the nearest multiple of 1, 10, or 100 then adjust; • develop further the relationship between addition and subtraction. 

Year 6

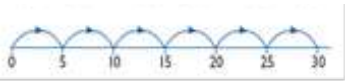
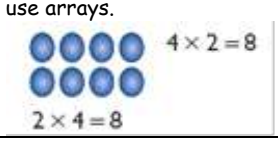
National Curriculum statutory	Examples	Mental strategies
• They undertake mental calculations with increasingly large numbers and more complex calculations.	**Subtract large numbers** e.g. 269 000 – 42 000 **Subtract negative numbers in context** e.g decrease from 6°C by -1°C **<u>Also include:</u>** **Subtract 4-digit multiples of 100** e.g. 6200 – 3800, 6100 - ☐ = **Subtract any number with 3 decimal places from a whole number** e.g. 5 - 0.314, 1 - ☐ = 0.368 **Subtract decimals with a different number of decimal places** e.g. 0.67 – 0.2, 0.9 - ☐ = 0.53	• consolidate all strategies from previous years; • use known facts and place value to add; • find a difference by counting up through the next multiple of 10, 100 or 1000. • subtract the nearest multiple of 0.1, 10, 100 or 1000, then adjust; • continue to use the relationship between addition and subtraction. 

Mental methods for MULTIPLICATION

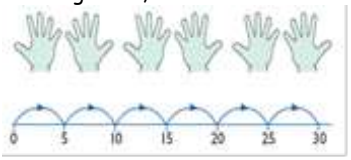
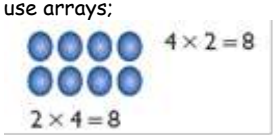
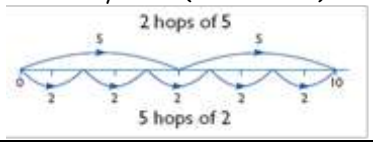
EYFS

Early skills
Multiplication as counting in equal steps - '5, 10, 15, 20', or in twos or tens or other multiples Include practical activities and number rhymes. – leading to multiplication as repeated addition. 
Doubling 

Year 1

National Curriculum statutory	Examples	Mental strategies
• **solve simple one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.** • **make connections between arrays, number patterns, and counting in two, fives and tens.**	**Give children experience of counting equal groups of objects in 2s, 5s and 10s.** **Present practical problem solving activities involving counting equal sets or groups.** **<u>Also include:</u>** **Doubles of all numbers to 10**	• count in 2s, 5s and 10s; • repeated addition;  • links to doubling; • use arrays. 

Year 2

National Curriculum statutory	Examples	Mental strategies
• recall and use multiplication and division facts for the 3, 5 and 10 multiplication tables, including recognising odd and even numbers. • solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.	**Multiplication facts for x 2, x5 and x 10** e.g. 2 x 5, 5 x 6, 5 x ☐ = 20 **<u>Also include:</u>** **Double to 20** e.g. double 11, double 16, 13 + 13 **Multiply a 'teens' number by 2, 5 or 10** e.g. 14 x 5, 16 x 2	• counting in 2's, 5's and 10's  • repeated addition; 2 + 2 + 2 + 2 + 2 = 10 2 x 5 = 10 2 multiplied by 5 5 pairs • use arrays;  • use know facts and place value to multiply by 2, 5 or 10; • links to doubling; • reorder a calculation, knowing multiplication can be done in any order (commutative) 

Year 3

National Curriculum statutory	Examples	Mental strategies
• recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables. • write and calculate mathematical statements for multiplication and division using the multiplication tables that they know; - 2-digit numbers by 1-digit numbers using mental methods. • develop efficient methods, for examples using commutativity and associativity (e.g. 4 x 12 x 5 = 4 x 5 x 12= 20 x 12 = 240 and multiplication and division facts (e.g. using 3 x 2 =6, to derive related facts 30 x 2 = 60 etc	**Multiplication facts for x 3, x4 and x 8** e.g. 6 x 8, 3 x 6, 3 x ☐ = 24 **Multiply a 'teens' number by 3, 4 or 8** e.g. 14 x 3, 17 x 4 **Multiply a single digit number by 3, 4 or 8** e.g. 30 x 2, 8 x ☐ = 320 **Multiply a 2-digit number by a 1-digit number** e.g. 32 x 3, 5 x ☐ = 155 **Also include:** **Double to 50** **Multiply 3 numbers within known tables** e.g. 3 x 8 x 2, 4 x 12 x 5	• counting in 2s, 5s,10s,3s, 4s and 8s • repeated addition; • use know facts and place value to multiply by 2, 3, 4, 5, 8 or 10; • use doubles to link x2, x4 and x 8 tables • reorder a calculation, knowing multiplication can be done in any order (commutative) e.g. 2 x3 = 3 x 2 • use the rule of associativity e.g. (2 x 3) x 4 = 2 x (3 x 4) • scaling up using known facts; • use the relationship between multiplication and division.

Year 4

National Curriculum statutory	Examples	Mental strategies
• recall multiplication and division facts for multiplication tables up to 12 x 12 • use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers • recognise and use factor pairs and commutativity in mental calculations. • practise mental methods and extend this to 3-dgit numbers to derive facts (e.g. 600 ÷ 3 = 200 can be derived from 2 x 3 = 6)	**Multiplication numbers to 12 x 12** e.g. 12 x 8, 9 x 7, 11 x ☐ = 121 **Multiplying 3 numbers** e.g. 8 x 7 x 5, 5 x 14 x 4 **Multiply by 1 and 0** **Also include:** **Multiply a number to 12 by a multiple of 10** e.g. 12 x 70, 90 x 6, 8 x ☐ = 560 **Multiply a number to 12 by a multiple of 100** e.g. 300 x 7, 900 x ☐ = 8100 **Multiply a 'teens' number by a 1-digit number.** e.g. 15 x 8, 6 x 17 **Doubles of any 2-digit numbers**	• counting in 6, 7, 9, 25 and 1000; • use commutavity and tables to multiply; e.g. 2 x 3 = 3 x 2 • use partitioning and the distributative law to multiply 43 40 + 3 ↓ ↓ ×6 240 + 18 = 258 Also record mental multiplication using partitioning: $14 \times 3 = (10 + 4) \times 3$ $= (10 \times 3) + (4 \times 3) = 30 + 12 = 42$ $43 \times 6 = (40 + 3) \times 6$ $= (40 \times 6) + (3 \times 6) = 240 + 18 = 258$ • use factor pairs and the associativity to multiply e.g. 14 x 12 = (2 x 7) x 12 = 2 x (7 x 12) • use known facts and place value to multiply; • scaling up using know facts.

Year 5

National Curriculum statutory	Examples	Mental strategies

• multiply and divide numbers mentally drawing upon know facts. • multiply and divide whole numbers and those decimals by 10, 100 and 1000. • solve problems involving multiplication and division, including using their knowledge of factors and multiples, squares and cubes.	**Multiply a 2-digit number by a 1-digit number** e.g. 4 x 35, 28 x ☐ = 140 **Multiply whole numbers by 10, 100 and 1000** e.g. 327 x 10, 83 x 1000 **Multiply decimals by 10, 100 and 1000** e.g. 3.27 x 10, 0.82 x ☐ = **Also include:** **Multiply a multiple of 10 by a multiple of 10** e.g. 50 x 60, 60 x ☐ = 42 000 **Multiplying 3 numbers (including teens)** e.g. 3 x 40 x 6, 70 x 5 x 20 **Double any multiple of 5 up to 500.**	• counting in steps of powers of 10; • use commutavity and tables to multiply; • use partitioning and the distributative law to multiply e.g. 39 x 7 = 30 x 7 + 9 x 7 • use factor pairs and the associativity to multiply; e.g. 2 x 3 = 6, 6 has a factor pair of 2 and 3 • use known facts and place value to multiply; • scaling up by using know facts; • use related facts to multiply; • use the relationship between multiplication and division; • recognise and use square and cube numbers.

Year 6

National Curriculum statutory	Examples	Mental strategies
• multiply one-digit numbers up to two decimal places by whole numbers • multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places. • Multiply decimals by whole numbers, starting with the simplest cases, such as 0.4 x 2 = 0.8, and in practical contexts, such as measures and money. • use multiplication tables to calculate mathematical statements in order to maintain fluency.	**Multiply a tenth number by a 1-digit number** e.g. 0.4 x 9, ☐ x 7 = 4.9 **Multiply a hundredths numbers by a 1-digit number** e.g. 00.6 x 3, 8 x ☐ = 0.56 **Also include:** **Multiply a multiple of 10 by a multiple of 100** e.g. 500 x 30, 60 x ☐ = 42 000 **Multiply a tenths number by a multiple of 10** e.g. 0.7 x 20 , 50 x 0.3 **Multiply a units and tenths number by a 1-digit number** e.g. 3.7 x 5, 4,3 x 4 **Double a units and tenths and decimals less than 1 (2.d.p)**	• use commutavity and tables to multiply; • use partitioning and the distributative law to multiply e.g. 39 x 7 = 30 x 7 + 9 x 7 • use factor pairs and the associativity to multiply; e.g. 14 x 12 = (2 x 7) x 12 = 2 x (7 x 12) and 2 x 3 = 6, 6 has factor pair of 2 and 3 • use known facts and place value to multiply; • scaling up by using know facts; • use related facts to multiply; • use the relationship between multiplication and division;

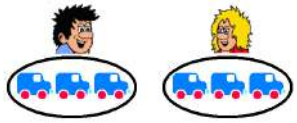
Mental methods for DIVISION

EYFS/Year 1

Sharing

- **Equal sharing** occurs when a quantity is shared out equally into a given number of portions, and we work out how many there are in each portion.
- When we share we know how many we have to share out and how many to share between but not how many they will each get.

6 toy cars are shared between 2 children. How many will they have each?



Grouping

- **Grouping** occurs when we are asked to find how many groups of the divisor are in the original amount.
- We know haw many we have and how many to put into each 'set' but not the number of 'sets' we will have.

There are 6 cars; each child can have 2 cars. How many children will get 2 cars?

Year 1

National Curriculum statutory	Examples
• solve simple one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher. • through grouping and sharing small quantities, pupils begin to understand multiplication and division; doubling numbers and quantities, and finding simple fractions of objects, numbers and quantities • make connections between arrays, number patterns, and counting in two, fives and tens.	Share these pencils equally between Asif and Ben. How many pencils will each of them get? Put half of these ten animals in the ark. How many of the animals are in the ark? How many children have two squares of this chocolate? **Also include:** **Halves of corresponding doubles to 10.**
Mental strategies	
• count in 2s, 5s and 10s; • links to halving; • use arrays.	

Year 2

National Curriculum statutory	Examples
• recall and use multiplication and division facts for the 3, 5 and 10 multiplication tables, including recognising odd and even numbers. • solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts. • work with a range of materials and contexts in which multiplication and division facts related to grouping and sharing discrete and continuous quantities, and relating these to fractions and measures (e.g. 40 ÷ 2= 20, 20 is a half of 40)	**Division facts for x 2, x5 and x 10** e.g. 10 ÷ 5, 30 ÷ 5, 20 ÷ ☐ = 4 **Also include:** **Halves of corresponding doubles to 20** e.g. half of 22, half of 32 **Divide a 2-digit number by 2,5 or 10 to give a 'teens' answer** e.g. 70 ÷ 5, 32 ÷ 2
Mental strategies	
• counting in 2's, 5's and 10's • link to arrays; • use know facts and place value to divide; • links to halving; • partition in different ways to divide;	

Year 3

National Curriculum statutory	Examples	Mental strategies

• recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables. • write and calculate mathematical statements for multiplication and division using the multiplication tables that they know; - 2-digit numbers by 1-digit numbers using mental methods.	**Division facts for x 3, x 4 and x 8** e.g. 48 ÷ 6, 24 ÷ ☐ = 3 **Divide a number by 3, 4 or 8 to give a 'teens' answer** e.g. 42 ÷ 3, 68 ÷ 4 **Divide a tens number by a 1-digit or tens number** e.g. 60 ÷ 3, 320 ÷ ☐ = 40 **Divide a 2 or 3-digit number by 3, 4 or 8** e.g. 96 ÷ 3, 184 ÷ 8 **Also include:** **Halves of corresponding doubles to 50.**	• counting in 2s, 5s,10s,3s, 4s and 8s • use know facts and place value to multiply by 2, 3, 4, 5, 8 or 10; • use halving to link ÷ 2, ÷ 4 and 8 tables • partition in different ways to divide e.g 84 ÷ 7 may be calculated by partitioning the 84 into a **multiple of the divisor** and the **remaining number** to be **divided separately.** Results are then added to find the answer **(quotient).** 84 70 + 14 ↓ ↓ ÷ 7 10 + 2 = 12 • scaling down using known facts;

Year 4

National Curriculum statutory	Examples	Mental strategies
• recall multiplication and division facts for multiplication tables up to 12 x 12 • use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers • practise mental methods and extend this to 3-dgit numbers to derive facts (e.g. 600 ÷ 3 = 200 can be derived from 2 x 3 = 6)	**Division facts for the tables to 12 x 12** e.g. 96 ÷ 12, 121 ÷ ☐ = 11 **Dividing by 1** **Also include:** **Division linked to tables facts multiplied by a multiple of 10.** e.g. 840 ÷ 70, 560 ÷ ☐ = 9 **Division linked to tables facts multiplied by a multiple of 100** e.g. 2100 ÷ 7, 3600 ÷ 400 **Divide a number to give a 'teens' answer** e.g. 105 ÷ 7, 144 ÷ 9 **Halves of corresponding doubles of any 2-digit numbers**	• counting in 6, 7, 9, 25 and 1000; • use partitioning and the distributative law to divide e.g. 287 ÷ 7 • use factor pairs to divide e.g. 15 = 3 x 5, 15 has a factor pair of 3 and 5 or 600 ÷ 15 = 600 ÷ 3 ÷ 5 • use related facts to divide; • scaling down using known facts; • use the relationship between multiplication and division; • include calculations with remainders e.g. 96 ÷ 6 = (60 + 38) ÷ 6 = (60 ÷ 6) + (38 ÷ 6) = 10 + 6 r 2 = 16 r 2

Year 5

National Curriculum statutory	Examples	Mental strategies
• multiply and divide numbers mentally drawing	**Divide a 3-digit number by a 1-digit number**	• counting in steps of powers of 10;

upon know facts. • multiply and divide whole numbers and those decimals by 10, 100 and 1000. • apply all the multiplication tables and related division facts frequently, commit them to memory and use them confidently to make larger calculations.	e.g. 154 ÷ 7, 138 ÷ 6 **Divide whole numbers by 10, 100 and 1000** e.g. 32700 ÷ 10, 9600 ÷ 100 **Divide decimals by 10, 100 and 1000** e.g. 32.7 ÷ 10, 82.34 ÷ □ = 8.234 **<u>Also include:</u>** **Division linked to a multiples of 10 multiplied by a multiple of 10.** e.g. 3000 ÷ 60, 6300 ÷ 70 **Division involving remainders expressed in different ways** e.g. 98.4 = $^{98}/_{4}$ = 24 r 2 = 24 ½ = 24.5 **Halves of corresponding doubles of any multiple of 5 up to 500.**	• use partitioning and the distributative law to divide e.g. 98 ÷ 7 = (70 ÷ 7) + (28 ÷ 7) • use factor pairs to divide e.g. 15 = 3 x 5, 15 has a factor pair of 3 and 5 or 600 ÷ 15 = 600 ÷3 ÷5 • use known facts and place value to divide; • scaling down using know facts; • use related facts to divide; • use the relationship between multiplication and division;

Year 6

National Curriculum statutory	Examples	Mental strategies
• multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places. • use multiplication tables to calculate mathematical statements in order to maintain fluency. • introduced to division of decimal numbers by one-digit whole numbers.	**Division linked to tenths multiplied by a 1-digit number** e.g. 3.6 ÷ 9, 4.8 ÷ □ = 0.7 **Division linked to hundredths number multiplied by a 1-digit number** e.g. 0.18 ÷ 3, 0.56 ÷ □ = 0.7 **Divide numbers by 10, 100 and 1000** e.g. 0.7 ÷ 100, 25 ÷ 1000 **<u>Also include:</u>** **Division linked to a multiple of 10 multiplied by a multiple of 100** e.g. 42000 ÷ 600, 45000 ÷ 50 **Division linked to a tenths number multiplied by a multiple of 10** e.g. 14 ÷ 20, 15 ÷ 0.3 **Halves of corresponding doubles of units and tenths and decimals less than 1 (2.d.p)**	• counting in steps of powers of 10; • use partitioning and the distributative law to divide; e.g. 7.7 ÷ 7 = (7.0 ÷ 7) + (0.7 ÷ 7) = 1 + 0.1 = 1.1 • use factor pairs to divide • use known facts and place value to multiply; • scaling down using know facts; • use the relationship between multiplication and division; • include calculations with remainders

Written methods for ADDITION

Year 3	Year 4	Year 5	Year 6

Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction.

Use place value counters to secure conceptual understand
(Two-digits then three-digits)

↓↓↓ leading to ↓↓↓

Columnar Addition

No exchange

```
  4 3 5
+ 2 1 3
  6 4 8
```

One exchange

```
  4 3 5
+ 2 1 7
  6 5 2
    1
```

↓↓↓ leading to ↓↓↓

Two exchanges

```
  4 3 5
+ 2 8 7
  7 2 2
  1 1
```

Also include:

```
  6 7 9
+   7 3
  7 5 2
  1 1
```

```
  2 5 1
+   7 3
  3 2 4
    1
```

Add and subtract numbers with up to four digits, using the formal written method of columnar addition and subtraction where appropriate.

Columnar Addition

No exchange

```
  2 3 5 1
+ 5 4 1 3
  7 6 6 4
```

One exchange

```
  3 2 5 1
+ 5 4 7 3
  8 7 2 4
    1
```

Two exchanges

```
  2 9 3 8
+ 5 4 2 3
  8 3 6 1
  1   1
```

Three exchanges

```
  8 9 5 8
+ 5 4 2 3
 1 4 3 8 1
  1 1 1
```

Also include:

```
  3 7 5 8
+   4 1 3
  4 1 6 1
  1   1
```

```
  3 7 7 8
+   4 8 3
  4 2 6 1
  1 1 1
```

```
  3 5 1
  2 3 4
+ 4 2 3
 1 0 0 8
    1
```

```
  3 5 5
  2 3 4
+ 4 7 3
 1 0 6 2
  1   1
```

Decimal addition in the context of money

Add and subtract numbers with more than four digits, using the formal written methods of columnar addition and subtraction.

Formal written method

Various exchanges

```
  3 7 2 3 4
+ 7 5 4 7 9
 1 1 2 7 1 3
   1 1   1
```

Also include:

```
  2 3 4 6
    6 2
  4 0 1 3
+   5 6 1
  6 9 8 2
    1 1
```

Decimal addition in the context of money and measures to 3 decimal places

```
    2 3 . 1 5
  2 3 5 . 6 3
  9 0 3 . 0 9
+     7 . 3 6
 1 1 6 9 . 2 3
     1 1   2
```

Pupil practise addition, subtraction... for larger numbers, using the efficient written methods of columnar addition and subtraction.

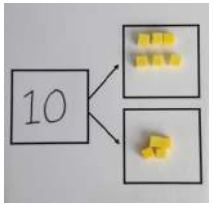
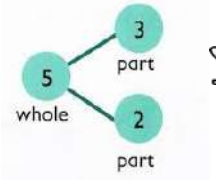
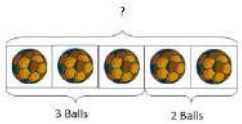
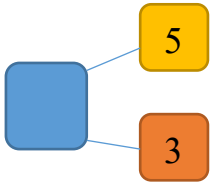
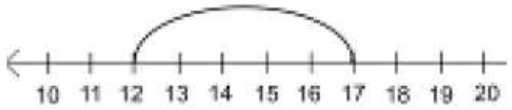
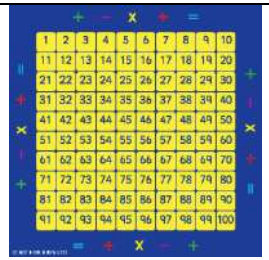
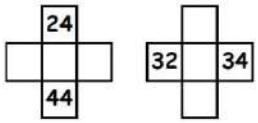
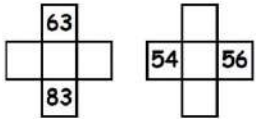
Effcient written method

```
  8 1 0 5 9
+   3 6 6 8
  1 5 3 0 1
  2 0 5 5 1
 1 2 0 5 7 9
 1   1 1 1
```

Numbers with different decimal places
e.g. 5.234 + 43.19 + 387.3

```
    5 . 2 3 4
  4 3 . 1 9 0
+ 3 8 7 . 3 0 0
  4 3 5 . 7 2 4
  1 1       1
```

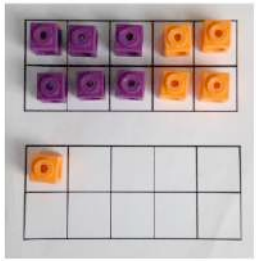
Progression of Addition

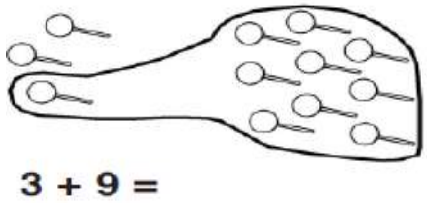
Addition	Objective and Strategies	Concrete	Pictorial	Abstract
Stage 1: Concrete objects and pictorial representations.	Combining two parts to make a whole: part- whole model EYFS/Year 1	  Use cubes to add two numbers together as a group or in a bar. 	   Use pictures to add two numbers together as a group or in a bar.  	4 + 3 = 7 10= 6 + 4  Use the part-part whole diagram as shown above to move into the abstract.
Stage 2: Number lines and 100 squares	Starting at the bigger number and counting on EYFS/Year 1 Year 2	 Start with the larger number on the bead string and then count on to the smaller number 1 by 1 to find the answer.	12 + 5 = 17  Start at the larger number on the number line and count on in ones or in one jump to find the answer.	5 + 12 = 17 Place the larger number in your head and count on the smaller number to find your answer.
	Using a 100 square – adding 10s by dropping down Year 1/Year 2	 Count on using a 100 square using counters. Drop down to add 10.	 Find missing numbers from a 100 square by using knowledge and pre-existing skills.  Drop down, count on and use pictorial representations.	17+11 Drop down and count on in jumps.

<table>
<tr>
<td rowspan="2">Stage 3:
Mental methods evolving into written methods</td>
<td>Regrouping to make 10.

EYFS/Year 1</td>
<td> 

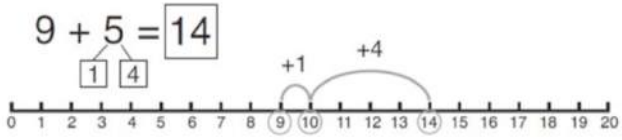
6 + 5 = 11

Start with the bigger number and use the smaller number to make 10.</td>
<td> 

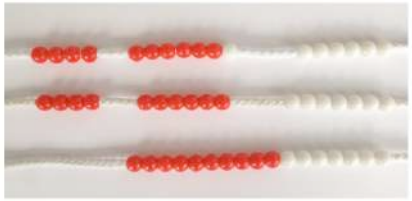
3 + 9 =

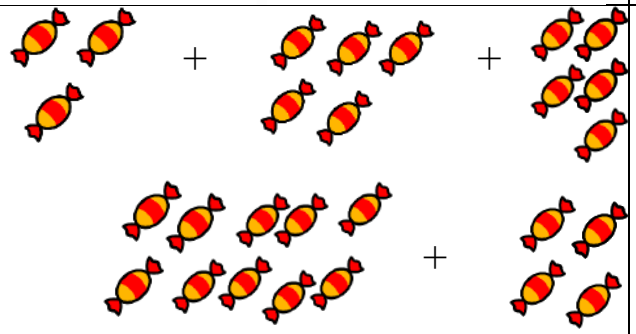
Use pictures or a number line. Regroup or partition the smaller number to make 10.

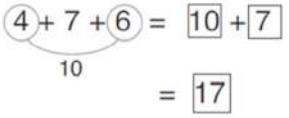
  </td>
<td>7 + 4= 11

If I am at seven, how many more do I need to make 10. How many more do I add on now?</td>
</tr>
<tr>
<td>Adding three single digits

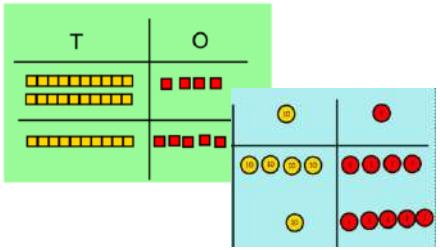
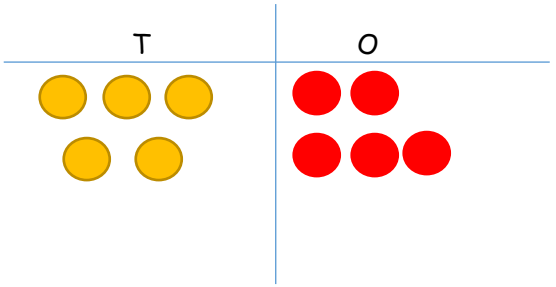
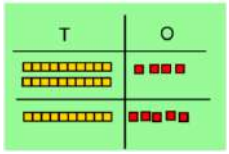
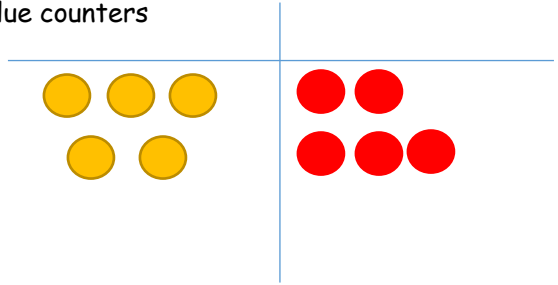
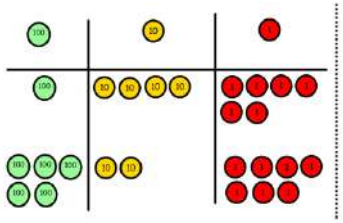
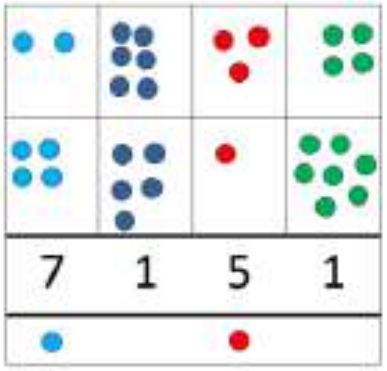
Year 2</td>
<td>4 + 7 + 6= 17
Put 4 and 6 together to make 10. Add on 7.

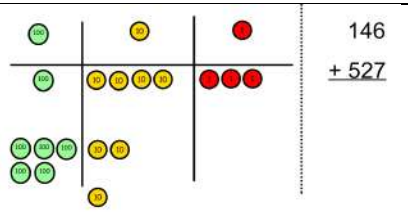
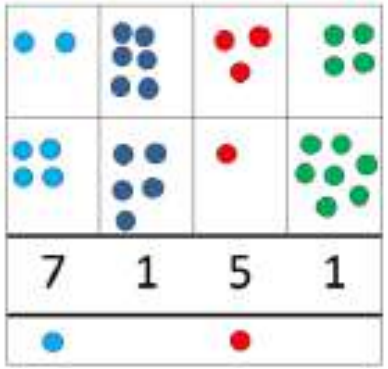
 

Following on from making 10, make 10 with 2 of the digits (if possible) then add on the third digit.</td>
<td> 

Add together three groups of objects. Draw a picture to recombine the groups to make 10.</td>
<td> 

Combine the two numbers that make 10 and then add on the remainder.</td>
</tr>
</table>

	Column method- no regrouping Year 2 Year 3	24 + 15= Add together the ones first then add the tens. Use the Base 10 blocks first before moving onto place value counters.  	After practically using the base 10 blocks and place value counters, children can draw the counters to help them to solve additions.  	Calculations 21 + 42 = 21 + 42
	Partitioning to add numbers mentally Year 2 Year 3	Use Base 10 to represent numbers in their partitioned stages  Then, add the tens together, then the ones.	Children move on to draw base 10 blocks and place value counters 	2 5 + 4 3 8 (5 + 3) 6 0 (20 + 40) 6 8
Stage 4: Column Method	Column method- regrouping Year 3 Year 4	Make both numbers on a place value grid.  146 + 527 Add up the ones and exchange 10 ones for one 10.	Children can draw a pictorial representation of the columns and place value counters to further support their learning and understanding.  	Start by partitioning the numbers before moving on to clearly show the exchange below the addition. As the children move on, introduce decimals with the same number of 536 + 85 621 1 1

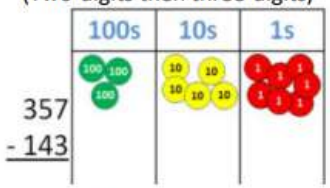
		 Add up the rest of the columns, exchanging the 10 counters from one column for the next place value column until every column has been added. This can also be done with Base 10 to help children clearly see that 10 ones equal 1 ten and 10 tens equal 100. As children move on to decimals, money and decimal place value counters can be used to support learning.		decimal places and different. Money can be used here.
Stage 5: Column addition, moving to decimals and larger numbers.	Column method moving to decimals and larger numbers/multiple numbers. Year 5 Year 6	As above, use physical representations such as large decimal points on a WB, using a line of children as numbers.	 As with above, show another column with striking decimal points.	$\begin{array}{rrcrrr} & 2 & 3 & . & 3 & 6 & 1 \\ & & 9 & . & 0 & 8 & \mathbf{0} \\ 5 & 9 & . & 7 & 7 & \mathbf{0} \\ + & 1 & . & 3 & \mathbf{0} & \mathbf{0} \\ \hline & 9 & 3 & . & 5 & 1 & 1 \\ & {\scriptstyle 2} & {\scriptstyle 1} & & {\scriptstyle 2} & & \end{array}$ Use and represent 0 as a place holder in step one. Units of measurement come as final steps.

Written methods of SUBTRACTION

Year 3

Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction.

Use place value counters to secure conceptual understand (Two-digits then three-digits)



↓↓↓ leading to ↓↓↓

700 + 40 + 1	600 130 11 ~~700~~ + ~~40~~ + ~~1~~	6 13 11 ~~7~~ 4 ~~1~~
− 300 + 60 + 7	− 300 + 60 + 7	− 3 6 7
	300 + 70 + 4	3 7 4

↓↓↓ leading to ↓↓↓

Columnar subtraction

No exchanges

5 3 6
- 3 2 1
2 1 5

One exchange

7 1
7 ~~8~~ ~~4~~
- 2 3 7
5 4 7

Two exchanges

1
6 2 1
~~7~~ 3 ~~5~~
- 2 7 8
4 5 7

Including zero

9
5 1 1
~~6~~ 0 ~~3~~
- 2 4 7
3 5 6

Year 4

Add and subtract numbers with up to four digits, using the formal written method of columnar addition and subtraction where appropriate.

Columnar subtraction

No exchanges

5 8 3 7
- 1 3 2 4
4 5 1 3

One exchange

6 1
4 ~~7~~ 6 7
- 2 3 9 2
2 3 7 5

Two exchanges

1
6 4 1
~~7~~ ~~5~~ 2 3
- 3 7 3 2
3 7 9 1

Three exchanges

1 1
5 2 1 1
~~6~~ ~~3~~ ~~2~~ ~~5~~
- 1 5 3 6
4 7 8 9

Including zero

9
5 1 1
~~6~~ ~~0~~ 4 3
- 4 7 8 1
1 2 6 2

Also include:

4 1
1 ~~5~~ 3 4
- 2 5 4
1 2 8 0

2 1 4 1
~~3~~ 1 ~~5~~ 5
- 5 3 6
2 6 1 9

Decimal subtraction in the context of money.

Year 5

Add and subtract numbers with more than four digits, using the formal written methods of columnar addition and subtraction.

Formal written method

Various exchanges

4 1 5 1
7 ~~5~~ 3 ~~6~~ 5
- 3 2 5 3 9
4 2 8 2 6

Also include:

4 1 5 1
7 ~~5~~ 3 ~~6~~ 6
- 6 2 7
7 4 7 3 9

1 1 3 1
~~2~~ 0 ~~4~~ 3 9
- 5 2 4 7
1 5 1 9 2

Decimal subtraction in the context of money and measures to 3.d.p

Year 6

Pupil practise addition, subtraction... for larger numbers, using the efficient written methods of columnar addition and subtraction.

Effcient written method

Numbers with different decimal places.

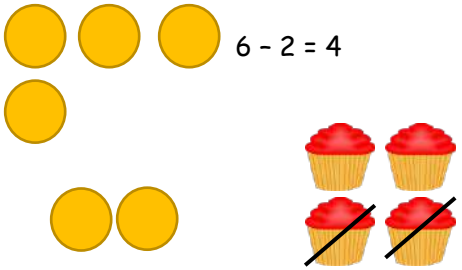
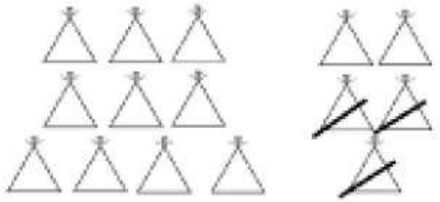
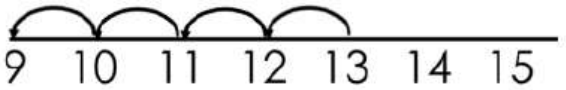
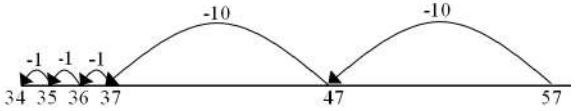
327.5 - 62.63

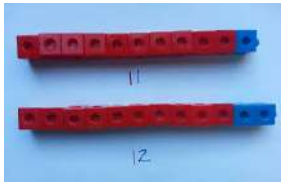
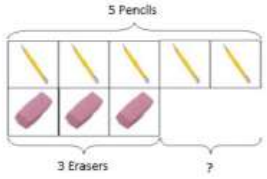
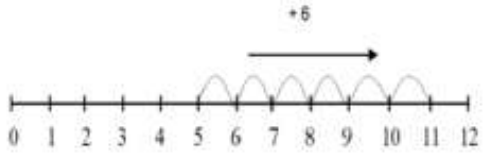
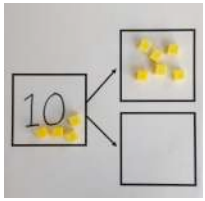
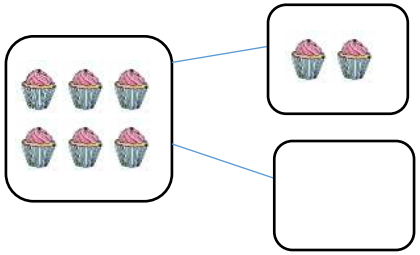
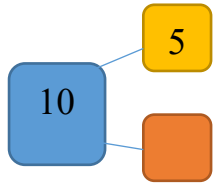
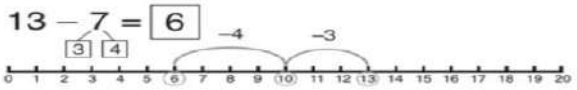
1
2 1 6 4 1
~~3~~ 2 ~~7~~ . ~~5~~ 0
- 6 2 . 6 3
2 6 4 . 8 7

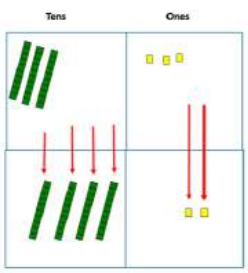
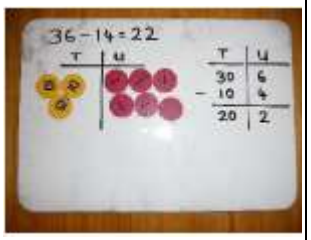
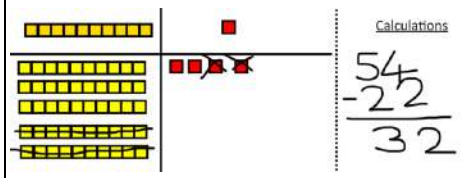
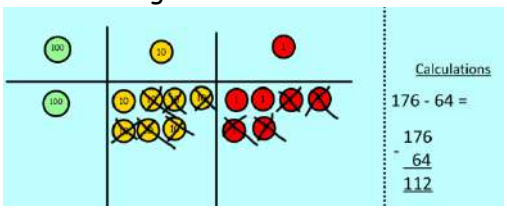
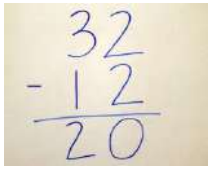
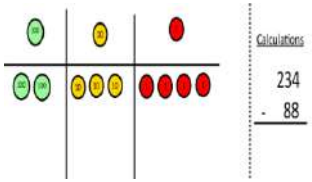
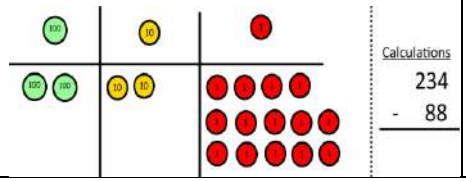
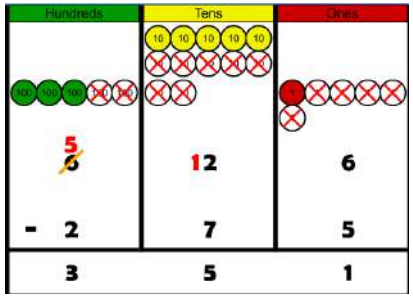
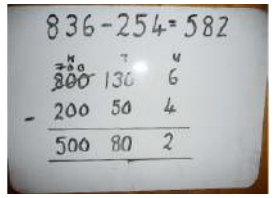
645.27 - 351.8

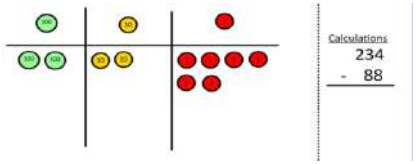
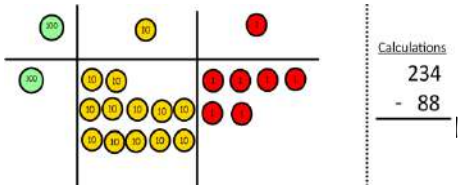
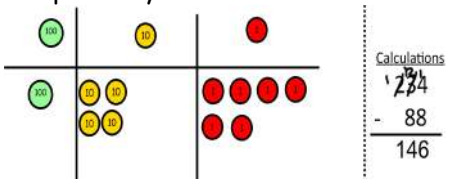
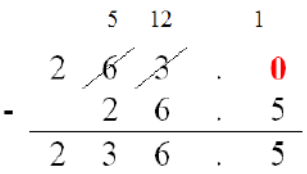
5 1 4 1
~~6~~ 4 ~~5~~ . 1 7
- 3 5 1 . 8 0
2 9 3 . 3 7

Decimal subtraction in the context of money and measures to 3.d.p

Progression of Subtraction				
Calculation Stage	**Objective and Strategies**	**Concrete**	**Pictorial**	**Abstract**
Stage 1: Concrete objects and pictorial representations	Taking away ones EYFS/Year 1	Use physical objects, counters, cubes etc to show how objects can be taken away.  6 – 2 = 4	Cross out drawn objects to show what has been taken away.  15 – 3 = 12	18 -3= 15 8 – 2 = 6
	Counting back EYFS/Year 1 Year 2	Make the larger number in your subtraction. Move the beads along your bead string as you count backwards in ones.  13 – 4 Use counters and move them away from the group as you take them away counting backwards as you go. 	Count back on a number line or number track  9 10 11 12 13 14 15 Start at the bigger number and count back the smaller number showing the jumps on the number line.  -10 -10 -1 -1 -1 34 35 36 37 47 57 This can progress all the way to counting back using two 2 digit numbers.	Put 13 in your head, count back 4. What number are you at? Use your fingers to help.

Stage 2: Number lines and 100 squares	Find the difference EYFS/Year 1 Year 2	Compare amounts and objects to find the difference.  Use cubes to build towers or make bars to find the difference  Use basic bar models with items to find the difference	 Count on to find the difference.	Hannah has 23 sandwiches, Helen has 15 sandwiches. Find the difference between the number of sandwiches.
	Part, Part Whole Model EYFS/Year 1 Year 2	 Link to addition- use the part whole model to help explain the inverse between addition and subtraction. If 10 is the whole and 6 is one of the parts. What is the other part? 10 - 6 =	Use a pictorial representation of objects to show the part part whole model. 	 Move to using numbers within the part whole model.
Stage 3: Linking concrete to abstract to decompose	Make 10 EYFS/Year 1 Year 2	14 – 9 =  Make 14 on the ten frame. Take away the four first to make 10 and then takeaway one more so you have taken away 5. You are left with the answer of 9.	 Start at 13. Take away 3 to reach 10. Then take away the remaining 4 so you have taken away 7 altogether. You have reached your answer.	16 – 8= How many do we take off to reach the next 10? How many do we have left to take off?

	Column method without regrouping Year 3	 Use Base 10 to make the bigger number then take the smaller number away. Show how you partition numbers to subtract. Again make the larger number first.  	 Draw the Base 10 or place value counters alongside the written calculation to help to show working.  	47 - 24 = 23 40 + 7 - 20 + 4 20 + 3 This will lead to a clear written column subtraction. 
Stage 4: Compact decomposition, moving to larger numbers and decimals	Column method with regrouping Year 3 Year 4 Year 5 Year 6	Use Base 10 to start with before moving on to place value counters. Start with one exchange before moving onto subtractions with 2 exchanges. Make the larger number with the place value counters  Start with the ones, can I take away 8 from 4 easily? I need to exchange one of my tens for ten ones.  	 Draw the counters onto a place value grid and show what you have taken away by crossing the counters out as well as clearly showing the exchanges you make.	 Children can start their formal written method by partitioning the number into clear place value columns.  Moving forward the children use a more compact method.

		Now I can subtract my ones.  Now look at the tens take away 8 tens easily? I need to exchange one hundred for ten tens.  Now I can take away eight tens and complete my subtraction.  Show children how the concrete method links to the written method alongside your working. Cross out the numbers when exchanging and show where we write our new amount.		This will lead to an understanding of subtracting any number including decimals. 

Written methods of MULTIPLICATION

Year 3

Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit.

Grid method

23 x 3

x	20	3
3	60	9

16 x 4

x	10	6
4	40	24

= 64

32 x 8

x	30	2
8	240	16

= 256

Year 4

Multiply two-digit and three-digit numbers by a one-digit number using formal written layout.

Grid method

135 x 6

x	100	30	5
3	600	180	30

= 810

```
  24
 x  3
 12
 60
 72
```

leading quickly to

Formal written layout

```
  42        36
 x  3      x  4
 126       144
             2

  312       273
 x  6      x  7
1872      1911
   1         52
```

Year 5

Multiply numbers up to 4 digits by a one- or two-digit number using an formal written method, including long multiplication for two-digit numbers.

Formal written method

```
  2513        6579
 x    7      x    8
17591      52632
 3  2       4 6 7
```

Long multiplication method

```
  27
 x34
108   (27 x 4)
810   (27 x 30)
918
```

```
  124        2374
 x 26       x  32
 744       4748
2480      71220
3224      74968
 1 1       1 2 1
```

Year 6

Multiply numbers up to 4 digits by a two-digit number using the formal written method of long multiplication.

Multiply one-digit numbers with up to two decimal places by whole numbers.

Formal written method

```
  6027        4378
 x  34       x  73
 2411       11234
18081      23506460
20491      319594
```

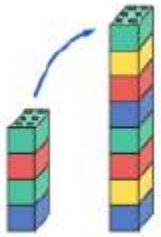
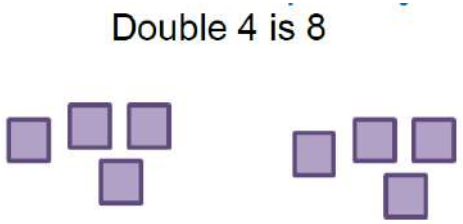
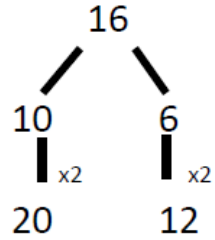
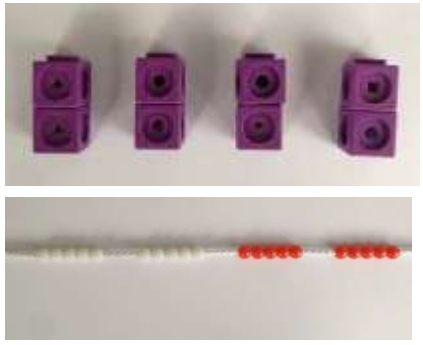
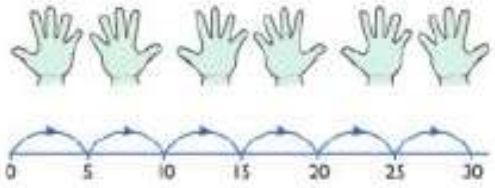
```
  8.7        8.68
 x  6       x  7
52.2       60.76
 4          4 5
```

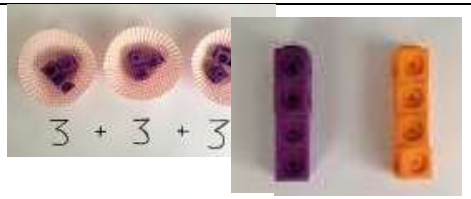
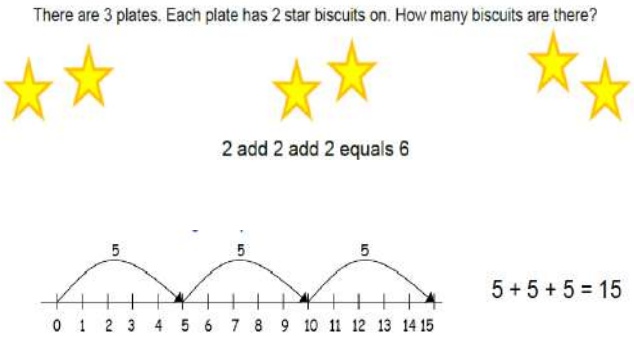
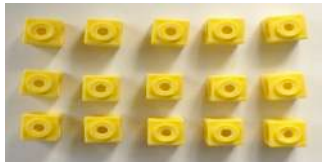
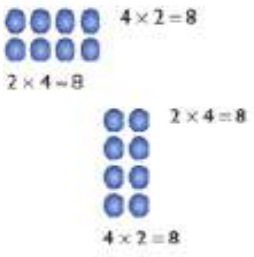
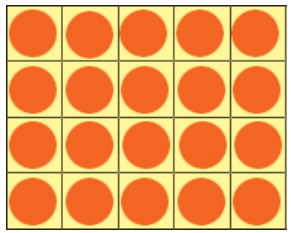
Also include:

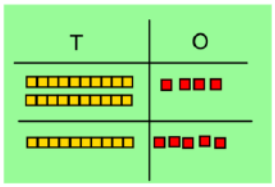
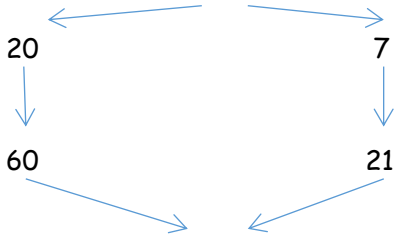
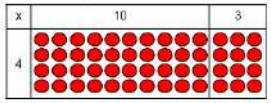
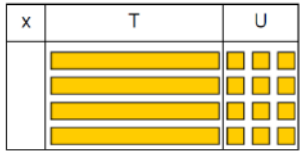
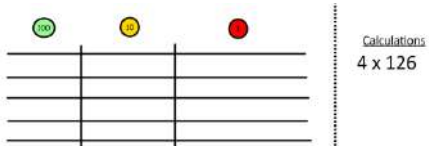
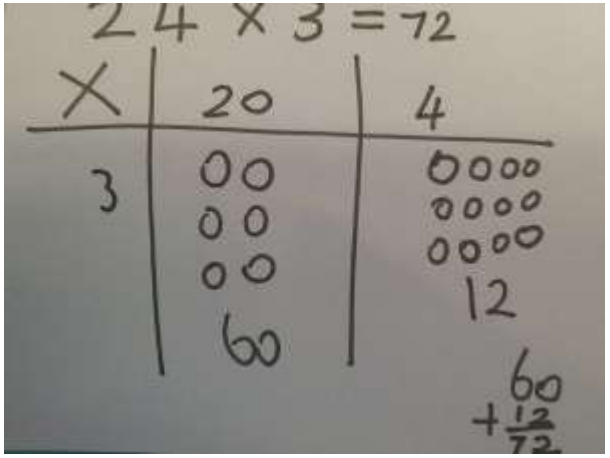
```
  784.9      41.68
 x    6     x   7
4709.4     261.76
 5 2 5      1 4
```

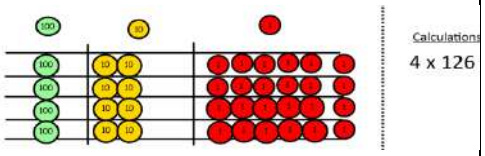
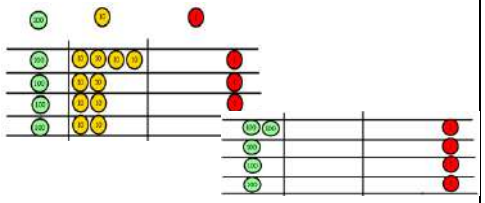
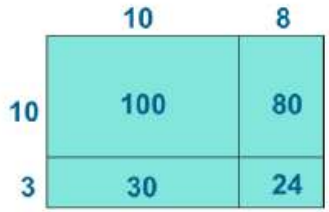
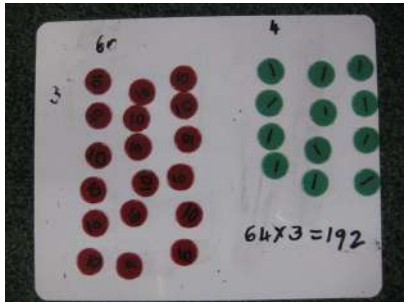
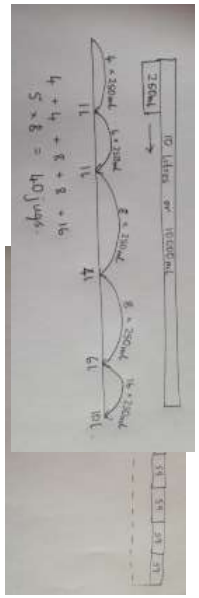
Decimal multiplication in the context of money and measures.

Progression of Multiplication

Calculation Stage	Objective and Strategies	Concrete	Pictorial	Abstract
Stage 1: Concrete objects and pictorial representations	Doubling EYFS/Year 1	Use practical activities to show how to double a number.  	Draw pictures to show how to double a number.  	 Partition a number and then double each part before recombining it back together.
	Counting in multiples EYFS/Year 1	 Count in multiples supported by concrete objects in equal groups.	 Use a number line/counting stick pictures to continue support in counting in multiples.	Count in multiples of a number aloud. Write sequences with multiples of numbers. 2, 4, 6, 8, 10 5, 10, 15, 20, 25 , 30

Stage 2: Arrays Stage 3: Repeated addition linking to practical apparatus	Repeated addition Year 1 Year 2	  Use different objects to add equal groups.	 	Write addition sentences to describe objects and pictures. 
	Arrays- showing commutative multiplication Year 1 Year 2 Year 3	Create arrays using counters/ cubes to show multiplication sentences.  	Draw arrays in different rotations to find **commutative** multiplication sentences. Link arrays to area of rectangles.  	Use an array to write multiplication sentences and reinforce repeated addition.  5 + 5 + 5 = 15 3 + 3 + 3 + 3 + 3 = 15 5 x 3 = 15 3 x 5 = 15

Stage 4: Number partitioning	Year 3	Use Base 10 to show a number partitioned into tens and ones.  Multiple each piece using known tables.	Partition numbers into 10s and 1s and multiply each part before recombining. 27 X 3 27  81	Use clear, well-formed number sentences and line up column values 27 X 3 20 X 3 = 60 7 X 3 = 21 60+21 = 81
	Grid Method Year 3 Year 4	Show the link with arrays to first introduce the grid method.  4 rows of 10 4 rows of 3 Move on to using Base 10 to move towards a more compact method.  4 rows of 13 Move on to place value counters to show how we are finding groups of a number.We are multiplying by 4 so we need 4 rows.  Fill each row with 126.	Children can represent the work they have done with place value counters in a way that they understand. They can draw the counters, using colours to show different amounts or just use circles in the different columns to show their thinking as shown below.  	Start with multiplying by one digit numbers and showing the clear addition alongside the grid. | ×	30	5
---	---	---
7	210	35	 **210 + 35 = 245** Moving forward, multiply by a 2 digit number showing the different rows within the grid method.

		 Add up each column, starting with the ones making any exchanges needed.  Then you have your answer.		 X 1000 300 40 2 10 10000 3000 400 20 8 8000 2400 320 16
Stage 5: Compact method 2x1 and 3x1 Stage 6: Compact method 2x2 and 3x2 and beyond	Column multiplication Year 3 Year 4 Year 5 Year 6	Children can continue to be supported by place value counters at the stage of multiplication.  It is important at this stage that they always multiply the ones first and note down their answer followed by the tens which they note below.	Bar modelling can support learners when solving problems with multiplication alongside the formal written methods. 	With long multiplication, remind the children about lining up their numbers clearly in columns. If it helps, children can write out what they are solving next to their answer. 32 x 24 8 (4 x 2) 120 (4 x 30) 40 (20 x 2) 600 (20 x 30) 768 1342 x 18 13420 10736 24156

Written method of DIVISION

Year 3

Pupils develop reliable written methods for.. division, starting with calculations of two-digit numbers and progressing to the formal written methods of short division.

Partitioning

39÷ 3

10 + 3 = 13
3) 30 + 9

64 ÷ 4

10 + 6 =
16
4) 40 + 24

72 ÷ 3

20 + 4 = 24
3) 60 + 12

Year 4

Pupils practise to become fluent in the formal written method of … short division with exact answers

Partitioning

119 ÷ 7

10 + 7 = 17
3) 70 + 49

216 ÷ 9

20 + 4 = 24
3) 180 + 36

Short division

3 | 39
make groups of 3

3) 6 3 → 2 1

6) 8 2 4 → 1 4

Year 5

Divide numbers up to 4 digits by a one-digit number using the formal written method of sort division and interpret remainders appropriately for the context.

Short division

3) 6 3 → 2 1

6) 8 2 4 → 1 4

3) 6 7 2 → 2 2 4

6) 7 1 3 1 8 → 1 2 3

7) 1 6 2 1 → 2 3

8) 2 7 3 2 → 3 4

6) 1 1 4 2 4 6 → 2 4 1

7) 9 2 4 3 1 3 5 → 1 3 4 5

There are 421 children here today. How many teams of 9 can we make?

9) 4 4 2 6 1 → 4 6 r 7

= 46 teams

206 tickets were sold for a concert, there are 7 seats per row, how many rows are needed?

7) 2 0 6 → 2 9 r 3

= 30 teams

Year 6

Divide numbers up to 4 digits by a two-digit number using the formal written method of short division.

Divide numbers up to four-digits by a two-digit whole number using the formal written method of long division.

Use written division methods in cases where the answer has up to two decimal places.

Formal written method

11) 4 4 9 5 → 0 4 5

21) 5 5 0 8 4 → 0 2 4

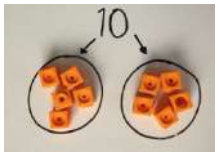
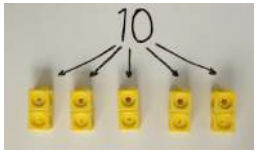
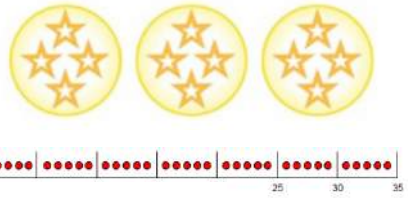
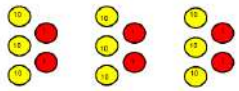
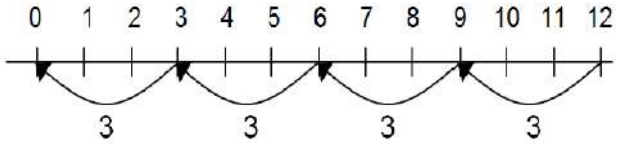
12) 4 4 3 7 3 1 2 → 3 6 1

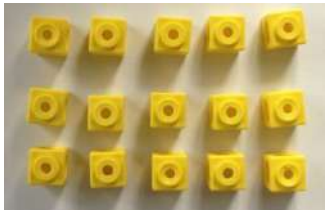
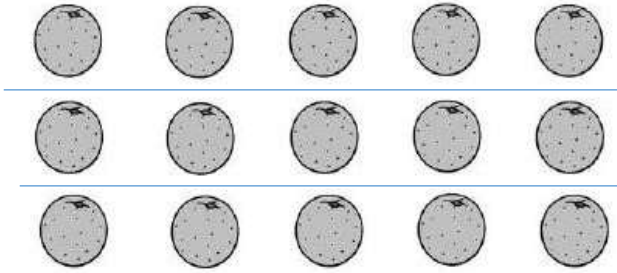
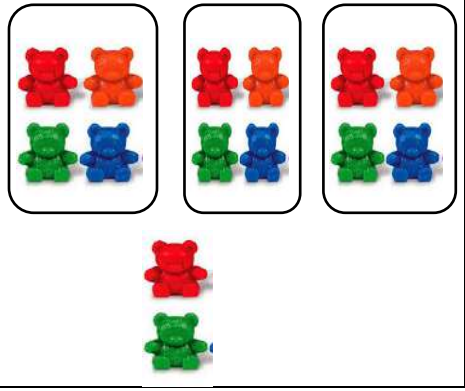
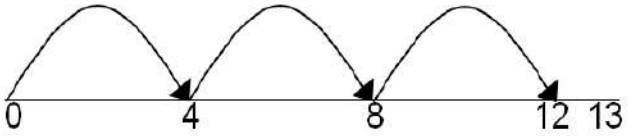
26) 3 4 3 2 → 1 3 2

- 2 6 0 0 x100
8 3 2
- 7 8 0 x30
5 2
- 5 2 x2
0

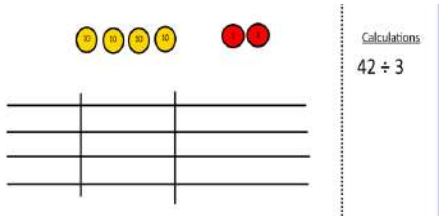
15) 3 9 6 . 0 → 2 6 . 4

- 3 0 0 x20
9 6
- 9 0 x6
6 . 0
- 6 . 0 x0.4
0

Progression in Division				
Calculation Stage	**Objective and Strategies**	**Concrete**	**Pictorial**	**Abstract**
Stage 1: Concrete objects and pictorial representations	Sharing objects into groups EYFS/Year 1	  I have 10 cubes, can you share them equally in 2 groups?	Children use pictures or shapes to share quantities.  8 ÷ 2 = 4	Share 9 buns between three people. 9 ÷ 3 = 3
Stage 2: Grouping or repeated subtraction	Division as grouping EYFS/Year 1 Year 2	Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding.   	Use a number line to show jumps in groups. The number of jumps equals the number of groups.  	28 ÷ 7 = 4 Divide 28 into 7 groups. How many are in each group?

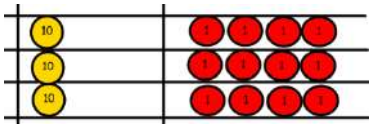
	Division within arrays Year 2	 Link division to multiplication by creating an array and thinking about the number sentences that can be created. Eg 15 ÷ 3 = 5 5 x 3 = 15 15 ÷ 5 = 3 3 x 5 = 15	 Draw an array and use lines to split the array into groups to make multiplication and division sentences.	Find the inverse of multiplication and division sentences by creating four linking number sentences. 7 x 4 = 28 4 x 7 = 28 28 ÷ 7 = 4 28 ÷ 4 = 7
	Division with a remainder Year 3 Year 4	14 ÷ 3 = Divide objects between groups and see how much is left over 	Jump forward in equal jumps on a number line then see how many more you need to jump to find a remainder.  Draw dots and group them to divide an amount and clearly show a remainder. 	Complete written divisions and show the remainder using r. 

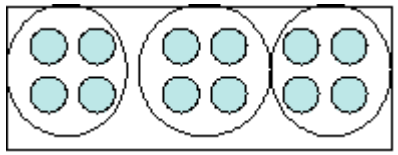
<table>
<tr>
<td>Stage 3: Short division (Bus stop)</td>
<td>Short division

Year 3
Year 4
Year 5</td>
<td rowspan="2">Use place value counters to divide using the bus stop method alongside
42 ÷ 3=
 

Start with the biggest place value, we are sharing 40 into three groups. We can put 1 ten in each group and we have 1 ten left over.

We exchange this ten for ten ones and then share the ones equally among the groups.

 
We look how much in 1 group so the answer is 14.</td>
<td rowspan="2">Students can continue to use drawn diagrams with dots or circles to help them divide numbers into equal groups.

Encourage them to move towards counting in multiples to divide more efficiently.

Write down higher multiplication tables to help with trickier numbers:

16
32
48
64
80
96
112
128</td>
<td rowspan="2">Begin with divisions that divide equally with no remainder.

$$\begin{array}{r} 2\ 1\ 8 \\ 4\overline{)\,8\ 7\ 2} \\ \quad\ 3 \end{array}$$

Move onto divisions with a remainder.

$$\begin{array}{r} 8\ 6\ \text{r}\ 2 \\ 5\overline{)\,4\ 3\ 2} \\ \quad\ 3 \end{array}$$</td>
</tr>
<tr>
<td>Stage 4:
Long division</td>
<td>Long division

Year 6</td>
</tr>
</table>