Riverview Junior School Calculation Policy

Edited and redrafted by EE Sept 2020

Intent

At Riverview Junior School we provide a diverse, challenging and inspiring curriculum that enables children to develop confidence, resilience and a sense of achievement at every level. All pupils will be taught the importance of individuality and the need to respect others and the environment - both local and across the wider world. We educate and enable the children of our future to grow into well-rounded citizens.

Purpose of Study

The ability to calculate is an important part of mathematics and an important part of coping with society's demands and managing everyday events. There are several ways of carrying out calculations: working them out mentally, working them out mentally with jottings, using formal written methods or a combination of these. Mental and written calculation methods should be taught alongside each other throughout the entirety of this progression. The use of visual and physical representation should be used to develop pupils' conceptual understanding of calculations. When teaching children to calculate, emphasis should be placed on choosing and using the method that is most efficient; if a child can complete a calculation mentally or with jottings, they should not be expected to complete a written algorithm.

Aims

At Riverview Junior School our calculation policy aims to:

- Provide guidance for staff and parents on the variety of methods that can be used to calculate.
- Provide guidance on how these methods can be developed over the key stage.
- Provide guidance on how visual and physical representation can be used to support conceptual understanding.
- List those number facts that children are expected to recall rapidly;
- Give clear year-by-year expectations of a range of calculations children should be able to do mentally;
- Give guidance in the use of jottings to aid a mental strategy;
- Provide guidance in the progression of written methods from expanded forms to the use of compact forms of recording.

Process of Calculation

When faced with a calculation children must be taught to think through the following questions:

- Can I do this in my head?"
- Can I do this in my head using drawings or jottings?'
- 'Do I need a pencil and paper procedure?

The Aims of the curriculum:

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

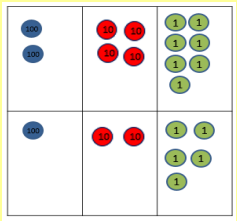
- ✓ become **fluent** in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.

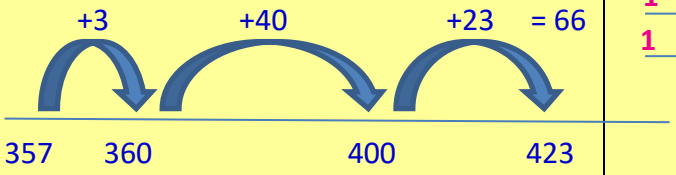
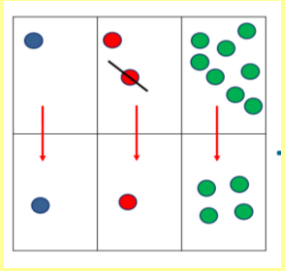
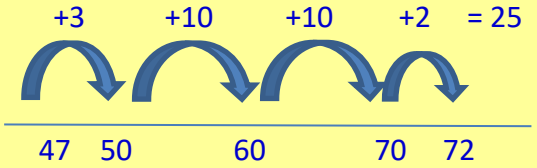
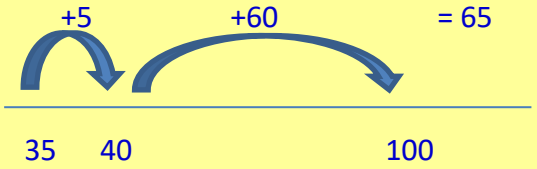
- ✓ **reason mathematically** by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language

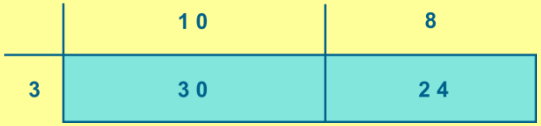
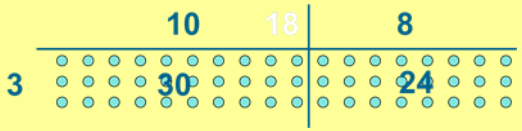
- ✓ can **solve problems** by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

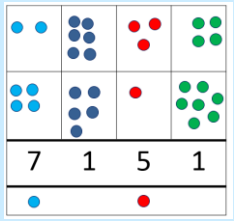
Lower Key stage 2

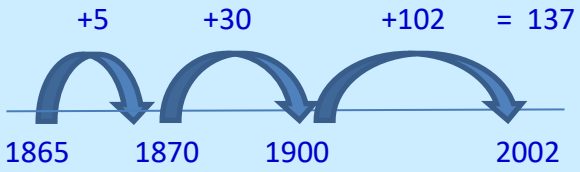
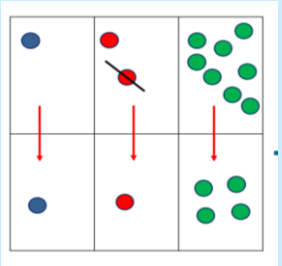
In year 3 and 4, children build on the concrete and conceptual understandings they have gained in key stage 1 to develop a real mathematical understanding of the four operations, in particular developing arithmetical competence in relation to larger numbers. In addition and subtraction, they are taught to use place value and number facts to add and subtract numbers mentally and will develop a range of strategies to enable them to discard the 'counting in ones' or fingers-based methods of KS1. In particular, they will learn to add and subtract multiples and near multiples of 10, 100 and 1000, and will become fluent in complementary addition as an accurate means of achieving fast and accurate answers to 3-digit subtractions. Standard written methods for adding larger numbers are taught, learned and consolidated, and written column subtraction is also introduced. This key stage is also the period during which all the multiplication and division facts are thoroughly memorised, including all facts up to the 12 x 12 table. Efficient written methods for multiplying or dividing a 2-digit or 3-digit number by as single-digit number are taught, as are mental strategies for multiplication or division with large but friendly numbers, e.g. when dividing by 5 or multiplying by 20. Children will develop their understanding of fractions, learning to reduce a fraction to its simplest form as well as finding non-unit fractions of amounts and quantities. The concept of a decimal number is introduced and children consolidate a firm understanding of one-place decimals, multiplying and dividing whole numbers by 10 and 100.

		Mental Calculation	Written Calculation	Default for All children
Year 3	***Addition***	Know pairs with each total to 20 Know pairs of multiples of 10 with a total of 100 Add any two 2-digit numbers by counting on in 10s and 1s or by using partitioning Add multiples and near multiples of 10 and 100 Perform place value additions without a struggle. (E.g. 300 + 8 + 50 = 358) Use place value and number facts to add a 1-digit or 2-digit number to a 3-digit number. (E.g. 104 + 56 is 160 since 104+50=154 and 6+4=10 and 676 + 8 is 684 since 8=4+4 and 76+4+4=84) Add pairs of 'friendly' 3-digit numbers, e.g. 320 + 450 Begin to add amounts of money using partitioning.	Build on partitioning to develop expanded column addition with two 3-digit numbers e.g. 247 + 125 (use base10 or place value counters to model). **200 + 40 + 7** **100 + 20 + 5** **300 + 60 +12 = 372**  Use expanded column addition where digits in a column add to more than the column value **400 + 60 + 6** **300 + 50 + 8** **100 10** **800 + 20 + 4 = 824** Begin to use compact column addition, initially introduced alongside the expanded method. The formal method should be seen as a more streamlined version of the expanded method, not a new method. **1 2 3** **2 0 8** **4 5 1** **1** **7 8 2** Begin to add like fractions. (E.g. $^3/_8 + ^1/_8 + ^1/_8$) Recognise fractions that add to 1. (E.g. ¼ + ¾ or $^3/_5 + ^2/_5$)	Know pairs of numbers which make each total up to 10, and which total 20 Add two 2-digit numbers by counting on in tens and ones (E.g. 56 + 35 is 56 + 30 and then add the 5) Understand simple place value additions: 200 + 40 + 5 = 245 Use place value to add multiples of 10 or 100

	Subtraction	Know pairs with each total to 20 Subtract any two 2-digit numbers Perform place value subtractions without a struggle. (E.g. 536 – 30 = 506, etc.) Subtract 2-digit numbers from numbers >100 by counting up. (E.g. 143 – 76 is done by starting at 76, add 4 (80) then add 20 (100) then add 43 making the difference a total of 67) Subtract multiples and near multiples of 10 and 100 Subtract, when appropriate, by counting back or taking away, using place value and number facts. Find change from £1, £5 and £10. Continue to use counting up as a mental strategy for subtracting pairs of three-digit numbers, e.g. 423 – 357 is  	Use expanded column subtraction for 3-digit and 4-digit numbers (including decomposition, modelled with base10 or place value counters).  20 12 200 ~~30~~ ~~2~~ - 100 10 4 100 10 8 Subtract like fractions. (E.g. $^{7}/_{8}$ - $^{3}/_{8}$) Recognise complements of any fraction to 1 e.g. $1 - {}^{1}/_{4} = {}^{3}/_{4}$ e.g. $1 - {}^{3}/_{5} = {}^{2}/_{5}$ **By end of year**, children to be taught compact column subtraction. 2 12 2 ~~3~~ ~~2~~ - 1 1 4 1 1 8	Know pairs of numbers which make each total up to 10, and which total 20 Count up to subtract 2-digit numbers: 72 – 47 is  Subtract multiples of 5 from 100 by counting up: 100 – 35 is  Subtract multiples of 10 and 100

	Multiplication	Know by heart all the multiplication facts up to 12 x 12. Multiply whole numbers by 10 and 100 Recognise that multiplication is commutative Use place value and number facts in mental multiplication. (E.g. 30 x 5 is 15 x 10) Partition teen numbers to multiply by a single-digit number. (E.g. 3 x 14 as 3 x 10 and 3 x 4) Double numbers up to 50	Use partitioning (grid multiplication) to multiply 2-digit and 3-digit numbers by 'friendly' single digit numbers.  If needed, written methods could be developed by using understanding of visual images.  Give children opportunities to explore this and deepen understanding using Dienes apparatus and place value counters. Towards the end of year, begin to multiply a 2-digit number by a number between 10 and 20 by partitioning (grid method)	Know by heart the 2x, 3x, 5x and 10x tables Double given tables facts to get others Double numbers up to 25 and multiples of 5 to 50
	Division	Know by heart all the division facts derived from the 2x, 3x, 4x, 5x, 8x and 10x tables. Divide whole numbers by 10 or 100 to give whole number answers Recognise that division is not commutative. Use place value and number facts in mental division. (E.g. 84 ÷ 4 is half of 42) Divide larger numbers mentally by subtracting the tenth multiple, including those with remainders. (E.g. 57 ÷ 3 is 10 + 9 as 10x3=30 and 9x3=27) Halve even numbers to 100, halve odd numbers to 20	Perform divisions just above the 10th multiple using horizontal or vertical jottings and develop understanding of how to give a remainder as a whole number. Use division facts to find unit and simple non-unit fractions of amounts within the times-tables e.g. $= {}^{3}/_{4}$ *of 48 is 3 × (48 ÷ 4) = 36*	Know by heart the division facts derived from the 2x, 3x, 5x and 10x tables Halve even numbers up to 50 and multiples of ten to 100 Perform divisions within the tables including those with remainders, e.g. 38 ÷ 5.

Year 4	***Addition***	Add any two 2-digit numbers by partitioning or counting on Know by heart/quickly derive number bonds to 100 and to £1 Add to the next hundred, pound and whole number. (E.g. 234 + 66 = 300, 3.4 + 0.6 = 4) Perform place value additions without a struggle. (E.g. 300 + 8 + 50 + 4000 = 4358) Add multiples and near multiples of 10, 100 and 1000. Add £1, 10p, 1p to amounts of money Use place value and number facts to add 1-, 2-, 3-and 4-digit numbers where a mental calculation is appropriate'. (E.g. 4004 + 156 by knowing that 6+4=10 and that 4004+150= 4154 so total is 4160)	Build on expanded column addition to develop compact column addition with larger numbers e.g. 1466 + 4868 1000 400 60 6 4000 800 60 8 + 1000 100 10 6000 300 30 4 **By end of year**, children to use compact column addition for 3-digit and 4-digit numbers 2 6 3 4 + 4 5 1 7 1 1 7 1 5 1  Use expanded and compact column addition to add amounts of money. Add like fractions, e.g. $^3/_5 + {}^4/_5 = {}^7/_5 = 1\ {}^2/_5$. Be confident with fractions that add to 1 and fraction complements to 1. (E.g. $^2/_3 + ? = 1$)	Add any 2-digit numbers by partitioning or counting on Number bonds to 20 Know pairs of multiples of 10 with a total of 100 Add friendly larger numbers using knowledge of place value and number facts Use expanded column addition to add 3-digit numbers

	Subtraction	Subtract any two 2-digit numbers Know by heart/quickly derive number bonds to 100 Perform place value subtractions without a struggle. (E.g. 4736 – 706 = 4030, etc.) Subtract multiples and near multiples of 10, 100 and 100 Subtract by counting up. (E.g. 503 – 368 is done by adding: 368 +2 +30 +100 +3 so we added 135) Subtract, when appropriate, by counting back or taking away, using place value and number facts. Subtract £1, 10p, 1p from amounts of money Find change from £10, £20 and £50. Use complementary addition **to subtract amounts of money, and for subtractions where the larger number is a near multiple of 1000 or 100** E.g. 2002 – 1865 is  	Use expanded column subtraction for 3-digit and 4-digit numbers (including decomposition, modelled with base10 or place value counters).  200 20 12 200 ~~30~~ ~~2~~ - 100 10 4 100 10 8 **By end of year**, all children to use compact column subtraction. 2 12 2 ~~3~~ ~~2~~ - 1 1 4 1 1 8 Subtract like fractions, e.g. $^4/_5 - {}^3/_5 = {}^1/_5$ Use fractions that add to 1 to find fraction complements to 1, e.g. $1 - {}^2/_3 = {}^1/_3$	Use counting up with confidence to solve most subtractions, including finding complements to multiples of 100. (E.g. 512 – 287 is done by

	Multiplication	Know by heart all the multiplication facts up to 12 x 12. Recognise factors up to 12 of two-digit numbers. Multiply whole numbers and one-place decimals by 10, 100, 1000 Multiply multiples of 10, 100, 1000 by single digit numbers. (E.g. 300 x 6 or 4000 x 8) Use understanding of place value and number facts in mental multiplication. (E.g. 36 x 5 is half of 36 x 10 and 50 x 60 = 3000) Partition 2-digit numbers to multiply by a single-digit number mentally. (E.g. 4 x 24 as 4 x 20 and 4 x 4) Multiply near multiples using rounding. (E.g. 33 x 19 as 33 x 20 – 33) Find doubles to double 100 and beyond using partitioning Begin to double amounts of money. (E.g. £35.60 doubled = £71.20.)	Use a vertical written method to multiply a one-digit by a 3-digit number (ladder) Use a vertical written method to multiply a three-digit by a 1-digit number (ladder) 2 5 3 X 6 1 8 (6 x 3) 3 0 0 (6 x 50) 1 2 0 0 (6 x 200) 1 5 1 8 Use an efficient written method to multiply a 2-digit number by a number between 10 and 20 by partitioning (grid method) × | 10 | 6 40 | 400 | 240 = 640 8 | 80 | 48 = 128 768 Use short multiplication to multiply a 1-digit number by a number with up to 4 digits 4 3 5 × 8 2 4 3 4 8 0	Know by heart multiplication tables up to 10 x 10 Multiply whole numbers by 10 and 100 Use grid method to multiply a 2-digit or a 3-digit number by a number up to and including 6

	Division	Know by heart all the division facts up to 144 ÷ 12. Divide whole numbers by 10, 100 to give whole number answers or answers with one decimal place Divide multiples of 100 by 1-digit numbers using division facts. (E.g. 3200 ÷ 8 = 400) Use place value and number facts in mental division. (E.g. 245 ÷ 20 is double 245 ÷ 10) Divide larger numbers mentally by subtracting the 10th or 20th multiple as appropriate. (E.g. 156 ÷ 6 is 20 + 6 as 20x6=120 and 6x6=36) Find halves of even numbers to 200 and beyond using partitioning Begin to halve amounts of money. (E.g. Half of £52.40 = £26.20) Use a written version of a mental method to divide a 2-digit or a 3-digit number by a single-digit number. Give remainders as whole numbers. e. g. *86 ÷ 3 as 20 × 3 (60) and 8 × 3 (24), remainder 2*	Use short division to divide a number with up to 3 digits by a number ≤ 12 $3\overline{)13^{1}9}$ = 4 6 r 1 Give remainders as whole numbers or as fractions. Begin to reduce fractions to their simplest forms. Find unit and non-unit fractions of larger amounts. e. g. $= {}^{7}/_{8}$ *of 56 is 7* × *(56 ÷ 8) = 49*	Know by heart all the division facts up to 100 ÷ 10. Divide whole numbers by 10 and 100 to give whole number answers or answers with one decimal place Perform divisions just above the 10th multiple using the written layout and understanding how to give a remainder as a whole number. Find unit fractions of amounts

Upper Key stage 2

In years 5 and 6, children move on from dealing mainly with whole numbers to performing arithmetic operations with both decimals and fractions. In addition and subtraction, children will consolidate their use of written procedures in adding and subtracting whole numbers with up to 6 digits and also decimal numbers with up to 2 decimal places. Mental strategies for adding and subtracting increasingly large numbers will also be taught. These will draw upon children's robust understanding of place value and knowledge of number facts. Negative numbers will be added and subtracted. In multiplication and division, efficient and flexible strategies for mental multiplication and division are taught and practised, so that children can perform appropriate calculations even when the numbers are large, such as 40 000 × 6 or 40 000 ÷ 8. In addition, it is in Years 5 and 6 that children extend their knowledge and confidence in using written algorithms for multiplication and division. Fractions and decimals are also added, subtracted, divided and multiplied, within the bounds of children's understanding of these more complicated numbers. Children will also calculate simple percentages and ratios.

		Mental Calculation	Written Calculation	Default for All children
Year 5	***Addition***	Know number bonds to 1 and to the next whole number Add to the next 10 from a decimal number e.g. *13·6 + 6·4 = 20* Add numbers with 2 significant digits only, using mental strategies (e.g. *3·4 + 4·8 & 23 000 + 47 000)* Add 1- or 2-digit multiples of 10, 100, 1000, 10 000 and 100 000 (e.g. *8000 + 7000 & 600 000 + 700 000)* Add near multiples of 10, 100, 1000, 10 000 and 100 000 to other numbers (e.g. *82 472 + 30 004)* Add decimal numbers which are near multiples of 1 or 10, including money (e.g. *6·34 + 1·99 & £34·59 + £19·95)* Use place value and number facts to add two or more 'friendly' numbers, including money and decimals (e.g. *3 + 8 + 6 + 4 + 7 & 0·6 + 0·7 + 0·4 & 2056 + 44)*	Continue to use column addition to add two or three whole numbers with up to 5 digits. Use column addition to add any pair of 2-place decimal numbers, including amounts of money. e.g. 15·68 + 27·86 1 5 · 6 8 + 2 7 · 8 6 1 1 · 1 4 3 · 5 4 Place value counters can be used alongside the columnar method to develop understanding of addition with decimal numbers. Begin to add related fractions using equivalences e.g. $^1/_2 + {}^1/_6 = {}^3/_6 + {}^1/_6$ Choose the most efficient method in any given situation	Add numbers with only 2 digits which are not zeros e.g. *3·4 + 5·8* Derive swiftly and without any difficulty number bonds to 100 Add 'friendly' large numbers using knowledge of place value and number facts Use expanded column addition to add pairs of 4- and 5-digit numbers

	Subtraction	Subtract numbers with 2 significant digits only, using mental strategies e.g. *6·2 – 4·5* e.g. *72 000 – 47 000* Subtract 1- or 2-digit multiples of 10, 100, 1000, 10 000 and 100 000 e.g. *8000 – 3000* e.g. *60 000 – 200 000* Subtract 1- or 2-digit near multiples of 10, 100, 1000, 10 000 and 100 000 from other numbers e.g. *82 472 – 30 004* Subtract decimal numbers which are near multiples of 1 or 10, including money e.g. *6·34 – 1·99* e.g. *£34·59 – £19·95* Use counting up subtraction, with knowledge of number bonds to 10, 100 or £1, as a strategy to perform mental subtraction e.g. *£10 – £3·45* e.g. *1000 – 782* Recognise fraction complements to 1 and to the next whole number e.g. $1\ ^{2}/_{5} + {}^{3}/_{5} = 2$ Use complementary addition (counting up) for subtractions where the larger number is a multiple or near multiple of 1000	Use compact column subtraction to subtract numbers with up to 5 digits e.g. 16 324 – 8516 Use column subtraction for subtraction of any pair of 2-place decimal numbers, including amounts of money. e.g. 35·68 - 27·86 Place value counters can be used alongside the columnar method to develop understanding of addition with decimal numbers. Begin to subtract related fractions using equivalences e.g. $^{1}/_{2} - {}^{1}/_{6} = {}^{2}/_{6}$ Choose the most efficient method in any given situation	Derive swiftly and without difficulty number bonds to 100 Use counting up with confidence to solve most subtractions, including finding complements to multiples of 1000 e.g. *3000 – 2387*

	Multiplication	Know by heart all the multiplication facts up to 12 × 12 Multiply whole numbers and 1- and 2-place decimals by 10, 100, 1000, 10 000 Use knowledge of factors and multiples in multiplication e.g. *43 × 6 is double 43 × 3* e.g. *28 × 50 is $^1/_2$ of 28 × 100 = 1400* Use knowledge of place value and rounding in mental multiplication e.g. *67 × 199 as 67 × 200 – 67* Use doubling and halving as a strategy in mental multiplication e.g. *58 × 5 is half of 58 × 10* e.g. *34 × 4 is 34 doubled twice* Partition 2-digit numbers, including decimals, to multiply by a 1-digit number mentally e.g. *6 × 27 as 6 × 20 (120) plus 6 × 7 (42)* e.g. *6·3 × 7 as 6 × 7 (42) plus 0·3 × 7 (2·1)* Double amounts of money by partitioning e.g. *£37·45 doubled is £37 doubled (£74) plus 45p doubled (90p) giving a total of £74·90*	Continue to use short multiplication to multiply a 1-digit number by a number with up to 4 digits Use a vertical written method to multiply a two-digit by a 2-digit number (ladder) 27 X 34 28 (4 x 7) 80 (4 x 20) 210 (30 x 7) 600 30 x 20) **918** **By end of year**, use long multiplication to multiply a 3-digit and 4-digit numbers by a number between 11 and 20 4 8 × 1 6 4 8 0 2 8 ⁴8 1 7 6 8 Choose the most efficient method in any given situation Find simple percentages of amounts e.g. *10%, 5%, 20%, 15% and 50%* Begin to multiply fractions and mixed numbers by whole numbers ≤ 10 e.g. *4 × $^2/_3$ = $^8/_3$ = 2 $^2/_3$*	Know multiplication tables to 11 × 11 Multiply whole numbers and 1-place decimals by 10, 100 and 1000 Use knowledge of factors as aids to mental multiplication e.g. *13 × 6 is double 13 × 3* e.g. *23 × 5 is $^1/_2$ of 23 × 10* Use the grid method to multiply numbers with up to 4 digits by 1-digit numbers Use the grid method to multiply 2-digit numbers by 2-digit numbers

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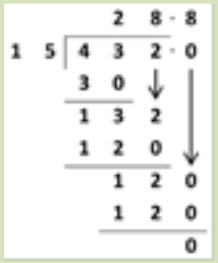
	Division	Know by heart all the division facts up to 144 ÷ 12 Divide whole numbers by 10, 100, 1000, 10 000 to give whole number answers or answers with 1, 2 or 3 decimal places Use doubling and halving as mental division strategies e.g. *34 ÷ 5 is (34 ÷ 10) × 2* Use knowledge of multiples and factors, as well as tests for divisibility, in mental division e.g. *246 ÷ 6 is 123 ÷ 3* e.g. *We know that 525 divides by 25 and by 3* Halve amounts of money by partitioning e.g. *$^1/_2$ of £75·40 = $^1/_2$ of £75 (£37·50) plus half of 40p (20p) which is £37·70* Divide larger numbers mentally by subtracting the 10th or 100th multiple as appropriate e.g. *96 ÷ 6 is 10 + 6, as 10 × 6 = 60 and 6 × 6 = 36* e.g. *312 ÷ 3 is 100 + 4 as 100 × 3 = 300 and 4 × 3 = 12* Know tests for divisibility by 2, 3, 4, 5, 6, 9 and 25 Know square numbers and cube numbers Reduce fractions to their simplest form	Use short division to divide a number with up to 4 digits by a number ≤ 12 4 6 r 1 3 | 1 3 ¹9 Give remainders as whole numbers or as fractions Find non-unit fractions of large amounts (e.g. $^3/_5$ of 265 is 3 × (265 ÷ 5) = 159) Turn improper fractions into mixed numbers and vice versa Choose the most efficient method in any given situation	Know by heart division facts up to 121 ÷ 11 Divide whole numbers by 10, 100 or 1000 to give answers with up to 1 decimal place Use doubling and halving as mental division strategies Use an efficient written method to divide numbers ≤ 1000 by 1-digit numbers Find unit fractions of 2- and 3-digit numbers

Year 6	***Addition***	Know by heart number bonds to 100 and use these to derive related facts e.g. *3·46 + 0·54* Derive, quickly and without difficulty, number bonds to 1000 Add small and large whole numbers where the use of place value or number facts makes the calculation do-able mentally e.g. *34 000 + 8000* Add multiples of powers of 10 and near multiples of the same e.g. *6345 + 199* Add negative numbers in a context such as temperature where the numbers make sense Add two 1-place decimal numbers or two 2-place decimal numbers less than 1 e.g. *4·5 + 6·3* e.g. *0·74 + 0·33* Add positive numbers to negative numbers e.g. *Calculate a rise in temperature or continue a sequence beginning with a negative number*	Continue to use column addition to add numbers with up to 5 digits Use column addition to add decimal numbers with up to 3 decimal places Add mixed numbers and fractions with different denominators (e.g. $^{1}/_{4} + {}^{2}/_{3} = {}^{11}/_{12}$ & $2\,{}^{1}/_{4} + 1\,{}^{1}/_{3} = 3\,{}^{7}/_{12}$)	Derive, swiftly and without difficulty, number bonds to 100 Use place value and number facts to add 'friendly' large or decimal numbers e.g. *3·4 + 6·6* e.g. *26 000 + 54 000* Use column addition to add numbers with up to 4-digits Use column addition to add pairs of 2-place decimal numbers

	Subtraction	Use number bonds to 100 to perform mental subtraction of any pair of integers by complementary addition e.g. *1000 – 654 as 46 + 300 in our heads* Use number bonds to 1 and 10 to perform mental subtraction of any pair of 1-place or 2-place decimal numbers using complementary addition and including money e.g. *10 – 3·65 as 0·35 + 6* e.g. *£50 – £34·29 as 71p + £15* Use number facts and place value to perform mental subtraction of large numbers or decimal numbers with up to 2 places e.g. *467 900 – 3005* e.g. *4·63 – 1·02* Subtract multiples of powers of 10 and near multiples of the same Subtract negative numbers in a context such as temperature where the numbers make sense. Use complementary addition for subtractions where the larger number is a multiple or near multiple of 1000 or 10 000.	Continue to use column subtraction for increasingly large numbers. Use column subtraction for subtractions of decimal numbers with up to 3 places, including money. Subtract mixed numbers and fractions with different denominators (e.g. $^{3}/_{4} - {}^{1}/_{3} = {}^{5}/_{12}$ & $2\,{}^{3}/_{4} - 1\,{}^{1}/_{3} = 1{}^{5}/_{12}$)	Use number bonds to 100 to perform mental subtraction of numbers up to 1000 by complementary addition e.g. *1000 – 654 as 46 + 300 in our heads* Use complementary addition for subtraction of integers up to 10 000 e.g. *2504 – 1878* Use complementary addition for subtractions of 1-place decimal numbers and amounts of money e.g. *£7·30 – £3·55*

	Multiplication	Know by heart all the multiplication facts up to 12 × 12 Multiply whole numbers and decimals with up to 3 places by 10, 100 or 1000 e.g. *234 × 1000 = 234 000* e.g. *0·23 × 1000 = 230* Identify common factors, common multiples and prime numbers and use factors in mental multiplication e.g. *326 × 6 is 652 × 3 which is 1956* Use place value and number facts in mental multiplication e.g. *4000 × 6 = 24 000* e.g. *0·03 × 6 = 0·18* Use doubling and halving as mental multiplication strategies, including to multiply by 2, 4, 8, 5, 20, 50 and 25 e.g. *28 × 25 is a quarter of 28 × 100 = 700* Use rounding in mental multiplication e.g. *34 × 19 as (34 × 20) – 34* Multiply 1- and 2-place decimals by numbers up to and including 10 using place value and partitioning e.g. *3·6 × 4 is 12 + 2·4* e.g. *2·53 × 3 is 6 + 1·5 + 0·09* Double decimal numbers with up to 2 places using partitioning e.g. *36·73 doubled is double 36 (72) plus double 0·73 (1·46)*	Use short multiplication to multiply a 1-digit number by a number with up to 4 digits 3 7 4 3 × 6 4 2 1 2 2 4 5 8 Use long multiplication to multiply a 2-digit number by a number with up to 4 digits 4 5 6 × 3 8 1 3 6 8 0 3 6 4 4 8 1 1 1 7 3 2 8 Use short multiplication to multiply a 1-digit number by a number with 1 or 2 decimal places, including amounts of money £ 1 3 · 7 2 × 6 2 4 1 £ 8 2 · 3 2 Multiply fractions and mixed numbers by whole numbers Multiply fractions by proper fractions e.g. $\frac{1}{2} \times \frac{1}{4} = \frac{1}{8}$ Use percentages for comparison and calculate simple percentages	Know by heart all the multiplication facts up to 12 × 12 Multiply whole numbers and 1- and 2-place decimals by 10, 100 and 1000 Use an efficient written method to multiply a 1-digit or a teen number by a number with up to 4 digits by partitioning (grid method) Multiply a 1-place decimal number up to 10 by a number ≤ 100 using the grid method

	Division	Know by heart all the division facts up to 144 ÷ 12 Divide whole numbers by powers of 10 to give whole number answers or answers with up to 3 decimal places Identify common factors, common multiples and primes numbers and use factors in mental division e.g. *438 ÷ 6 is 219 ÷ 3 which is 73* Use tests for divisibility to aid mental calculation Use doubling and halving as mental division strategies, for example to divide by 2, 4, 8, 5, 20 and 25 e.g. *628 ÷ 8 is halved three times: 314, 157, 78·5* Divide 1- and 2-place decimals by numbers up to and including 10 using place value e.g. *2·4 ÷ 6 = 0·4* e.g. *0·65 ÷ 5 = 0·13* e.g. *£6·33 ÷ 3 = £2·11* Halve decimal numbers with up to 2 places using partitioning e.g. *Half of 36·86 is half of 36 (18) plus half of 0·86 (0·43)* Know and use equivalence between simple fractions, decimals and percentages, including in different contexts Recognise a given ratio and reduce a given ratio to its lowest terms	Continue to use short division to divide a number with up to 4 digits by a 1-digit or a 2-digit number Use long division to divide 3-digit and 4-digit numbers by 2-digit numbers. Give remainders as whole numbers or as fractions or as decimals.  Divide a 1-place or a 2-place decimal number by a number ≤ 12 using place value - multiples of the divisors (e.g. *3.65 ÷ 5 as (365 ÷ 5) ÷ 100 = 0·73*) Divide proper fractions by whole numbers.	Know by heart all the division facts up to 144 ÷ 12 Divide whole numbers by 10, 100, 1000 to give whole number answers or answers with up to 2 decimal places Use an efficient written method, involving subtracting powers of 10 times the divisor, to divide any number of up to 1000 by a number ≤ 12 e.g. *836 ÷ 11 as 836 – 770 (70 × 11) leaving 66 which is 6 × 11, giving the answer 76* Divide a 1-place decimal by a number ≤ 10 using place value and knowledge of division facts