# Orford CEVA Primary School

# Calculation Policy



## "Whoever is faithful in little is also faithful in much"
## Luke 16:10

As a Christian school we endeavour and encourage everyone to believe that in joining together our individual skills, actions, thoughts and experiences, we can achieve our mission to sow faith, grow learning and inspire futures.

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| Adopted: Sept 2018 |
| Approved by Governors: |
| Review date: Sept 2021 |

Linked Policies:
Mathematics Policy
Curriculum policy
SEN Policy
Teaching and Learning Policy
AFL Policy
Marking and Feedback Policy
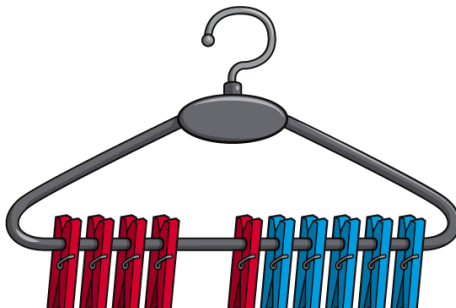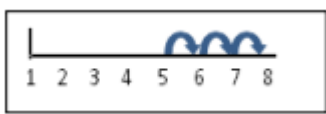Assessment, Reporting and Recording Policy

# KEY STAGE 1

Children in Years 1 and 2 will be given a really solid foundation in the basic building blocks of mental and written arithmetic. Through being taught place value, children will develop an under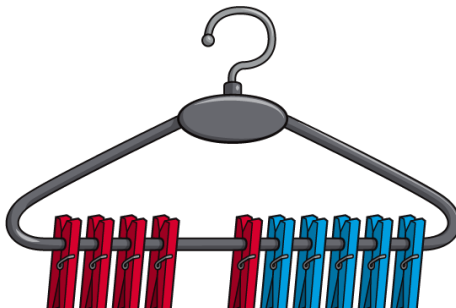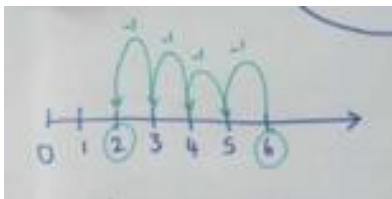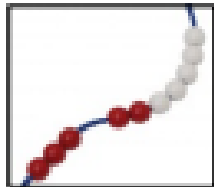standing of how numbers work, so that they are confident with 2-digit numbers and beginning to read and say numbers above 100.
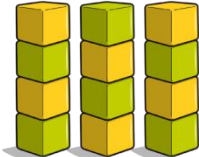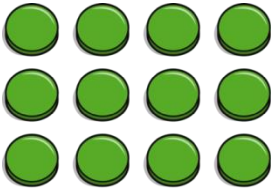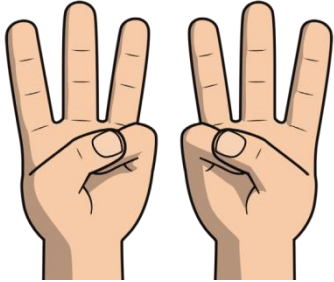
**Addition and Subtraction:** A focus on number bonds, first via practical hands-on experiences and subsequently using memorisation techniques, enables a good grounding in these crucial facts, and ensures that all children leave Year 2 knowing the pairs of numbers which make all the numbers up to 10 at least. Children will also have experienced and been taught pairs to 20. Children's knowledge of number facts enables them to add several 1-digit numbers, and to add/subtract a 1-digit number to/from a 2-digit number. Another important conceptual tool is the ability to add/subtract 1 or 10, and to understand which digit changes and why. This understanding is extended to enable children to add and subtract multiples of 10 to and from any 2-digit number. The most important application of this knowledge is the ability to add or subtract any pair of 2-digit numbers by counting on or back in 10s and 1s. Children may extend this to adding by partitioning numbers into 10s and 1s.
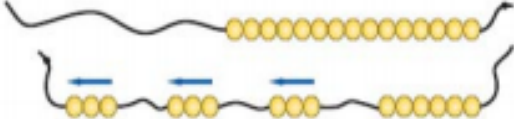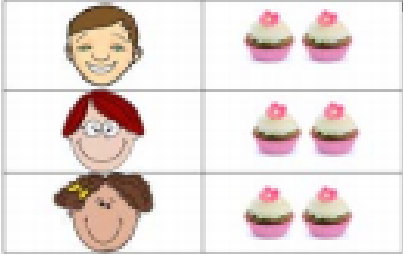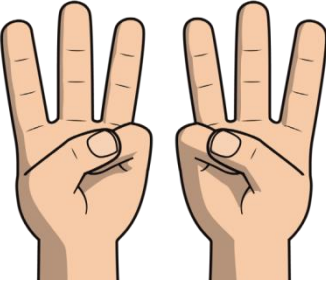
**Multiplication and Division:** Children will be taught to count in 2s, 3s, 5s and 10s, and will relate this skill to repeated addition. Children will meet and begin to learn the associated ×2, ×3, ×5 and ×10 tables. Engaging in a practical way with the concept of repeated addition and the use of arrays enables children to develop a preliminary understanding of multiplication, and asking them to consider how many groups of a given number make a total will introduce them to the idea of division. Children will also be taught to double and halve numbers, and will thus experience scaling up or down as a further aspect of multiplication and division.

**Fractions:** Fractions will be introduced as numbers and as operators, specifically in relation to halves, quarters and thirds.

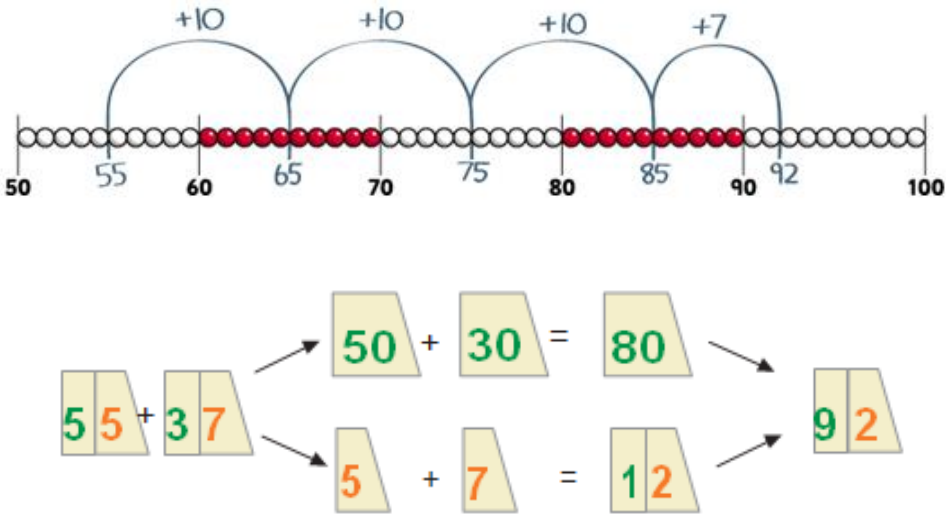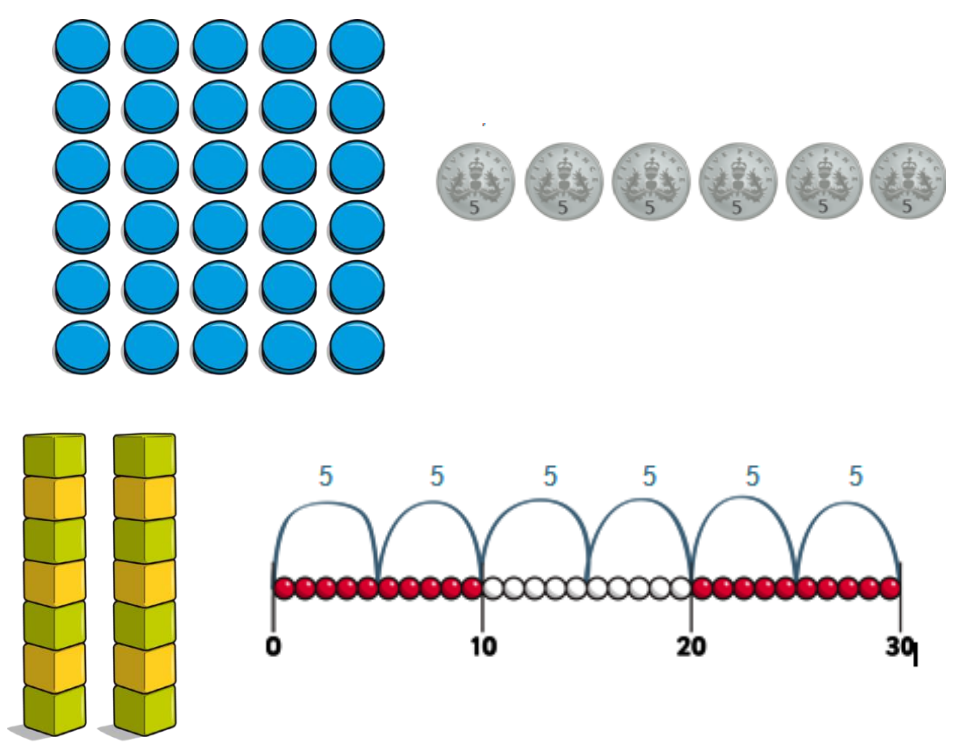| Year 1 - Addition | |
|---|---|
| **Mental methods** | Using number bonds/stories for numbers up to and including 10<br>Count on in 1s and 10s from any given 2 digit number<br>    *Beginning with larger number*<br>Add two, and then three 1 digit numbers<br>Use number facts to add a 1 digit number to a 2 digit number<br>    *Use 4+3=7 to calculate 24+3=27* |
| **Written methods** | Be able to record answers using numbers<br>Begin to copy full calculations (2+5=7)<br>Use images/objects to record and solve a concrete problem (including cubes and beads on string)<br>Count in 1s on a number line to add |
| **Example representations** | Adding on 10s             Bonds to 10<br><br><br>Using a number line       Using objects<br> |
| **Default skills** | Bonds to 10<br>Count in 1s<br>Count in 10s<br>Count on 1 or 10 from any given 2-digit number<br>Learning to start on the biggest number before counting on |

| Year 1 - Subtraction | |
|---|---|
| **Mental methods** | Using number bonds/stories for numbers up to and including 10<br>Count back in 1s and 10s from any given 2 digit number<br>Subtract two 1 digit numbers<br>Use number facts to subtract a 1 digit number to a 2 digit number<br>*Use 7-3=4 to calculate 27-3=24* |
| **Written methods** | Be able to record answers using numbers<br>Begin to copy full calculations (7-5=2)<br>Use images/objects to record and solve a concrete problem (including beads on string)<br>Count back in 1s on a number line |
| **Example representations** | Subtracting 10s             Bonds to 10<br><br>Using a number line     Counting back with objects |
| **Default skills** | Bonds to 10<br>Count back in 1s<br>Count back in 10s<br>Count back 1 or 10 from any given 2-digit number<br>Start with the biggest number and count back |

| Year 1 - Multiplication | |
|---|---|
| **Mental methods** | Count in 2s, 5s and 10s<br>Begin to say what three 5s are by counting out two 5s or three 4s etc.<br>Double numbers to 10 |
| **Written methods** | Begin to model and draw arrays<br>Use objects to make "groups of" 2, 5, 10 |
| **Example representations** |  |
| **Default skills** | Count in 2s 5s and 10s up to 10x<br>Double numbers to 10 |

| Year 1 - Division | |
|---|---|
| **Mental methods** | Count back in 2s, 5s and 10s<br>Find half of numbers to 20<br>Find half of even numbers by sharing |
| **Written methods** | Begin to model and draw arrays<br>Group and/or share concrete objects to find how many "sets of" numbers make larger ones. |
| **Example representations** |  |
| **Default skills** | Count back in 2s 5s and 10s from up to 10x<br>Half numbers to 20<br>Begin to group/share |

| Year 2 - Addition | |
|---|---|
| **Mental methods** | Know 1 or 10 more than any number<br>Add 10 or multiples of 10 to any 1 or 2 digit number (*76+20 as 76, 86, 96, working up to one hop 76+20=96*)<br><br>Add 2 digit numbers by:<br>　　　-adding 10s and 1s (*55+37 as 55+30 = 85 + 7 = 92*)<br>　　　-using knowledge of number facts to begin to partition *(55+37 as 50+30 and 5+7, then combine the totals 80 and 12)*<br><br>Add near multiples of 10 (19, 21) by adding the tens and adding/subtracting the 1<br><br>Add 3 one digit numbers by spotting bonds to 10, or doubles<br><br>Bridge through 10 when solving a 2 digit add 1 digit problem (*57+5 = 57+3 = 60 + 2 = 62*) |
| **Written methods** | Record answers using numbers and correctly place + and = symbols<br>Write full calculations<br>Record on a number line or hundred square to add |
| **Example representations** |  |
| **Default skills** | Know pairs of numbers which make each total up to 10<br>Add two 1-digit numbers<br>Add a 1-digit number to a 2-digit number by counting on in 1s<br>Add 10 and small multiples of 10 to a 2-digit number by counting on in 10s<br>Always start with the biggest number |

| Year 2 - Subtraction | |
|---|---|
| **Mental methods** | Know 1 or 10 less than any number<br>Subtract 10 or multiples of 10 to any 2 digit number (*76-20 as 76, 66, 56, working up to one hop 76-20=56*)<br><br>Subtract 2 digit numbers by:<br>    -subtracting then 10s and then the 1s (*55-32 as 55-30 = 25 - 2 = 23*)<br>    -using knowledge of number facts to begin to partition *(55-32 as 50-30 and 5-2, then combine the totals 20 and 3)*<br><br>Subtract near multiples of 10 (19, 21) by subtracting the closest number of tens and adding/subtracting the 1<br><br>Subtract using known addition facts (*3+7=10, so 10-3=7 and 10-7=3*)<br><br>Bridging through 10 when solving a 2 digit - 1 digit problem (*52-6 = 52-2= 50 - 4 = 46*)<br><br>Count up (with the aid of a number line) to find the difference between two close together 2 digit numbers |
| **Written methods** | Know corresponding subtraction facts for bonds to 10 and 20<br>Subtract two 1-digit numbers<br>Subtract a 1-digit number from a 2-digit number by counting back in 1s<br>Subtract 10 and small multiples of 10 from a 2-digit number by counting in 10s |
| **Example representations** |  |
| **Default skills** | Bonds to 10<br>Count back in 1s<br>Count back in 10s<br>Count back 1 or 10 from any given 2-digit number |

| Year 2 - Multiplication | |
|---|---|
| **Mental methods** | Count in 2s, 5s and 10 with confidence, begin to learn the tables by heart<br>Begin to count in 3s and 4s<br>Begin to double 2 digit numbers where the units digit is 1-5<br>Know doubles to 20<br><br>Understand the commutative rule (*5x3 = 3x5 and can be worked out either way*) |
| **Written methods** | Use arrays to find answers to multiplication problems (*3x4= 3 lots/rows of 4 things*)<br>Begin to use a number line to count in jumps (*3x4 = 3 jumps of 4 on a number line*) |
| **Example representations** |  |
| **Default skills** | Count in 2s, 5s and 10s with confidence<br>Begin to use and understand simple arrays<br>Double numbers up to 10<br>Double multiples of 10 to 50 |

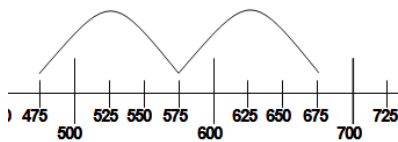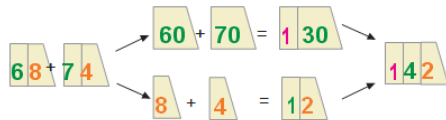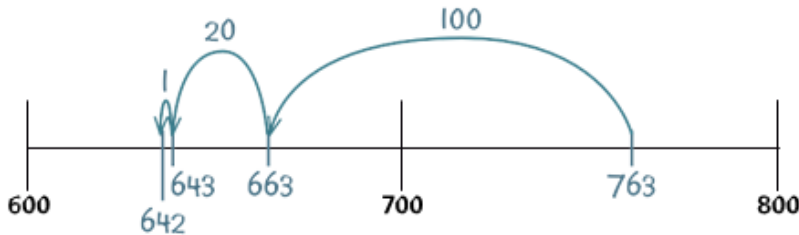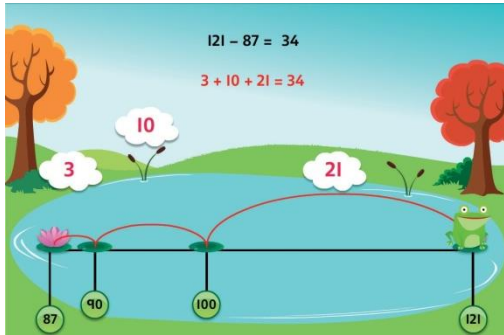| Year 2 - Division | |
|---|---|
| **Mental methods** | Count back in 2s, 5s and 10 with confidence from 10x the number |
| | Know division facts for 2s, 5s and 10s |
| | Begin to count back in 3s and 4s |
| | Half 2 digit numbers where the tens and units are even |
| | Know corresponding halves of even numbers up to 40 |
| | Know halves of multiples of 10 to 100 |
| | Begin to understand that halving an odd number gives ½ |
| | Begin to understand that division is the opposite of subtraction (*3x4=12, so 12÷3=4 and 12÷4=3*) |
| **Written methods** | Grouping: |
| | Use arrays or towers of cubes to group objects (*20 ÷ 5 as How many towers of 5 can I make from 20?*) |
| | Sharing: |
| | Find halves and quarters by sharing into 2 or 4 equal piles |
| | Find ½. ¼ and ¾ of small quantities using the sharing method |
| **Example representations** | Grouping: |
| |  |
| | Sharing: |
| |  |
| **Default skills** | Count in 2s, 5s and 10s |
| | Say how many rows in a given array |
| | e.g. *How many rows of 5 are in an array of 3 × 5?* |
| | Halve numbers to 24 |
| | Find $^1/_2$ of amounts |

# Lower Key Stage 2

In Lower Key Stage 2, 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.

**Addition and subtraction:** Children are taught to use place value and number facts to add and subtract numbers mentally and they will develop a range of strategies to enable them to discard the 'counting in 1s' or fingers-based methods of Key Stage 1. In particular, children 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.
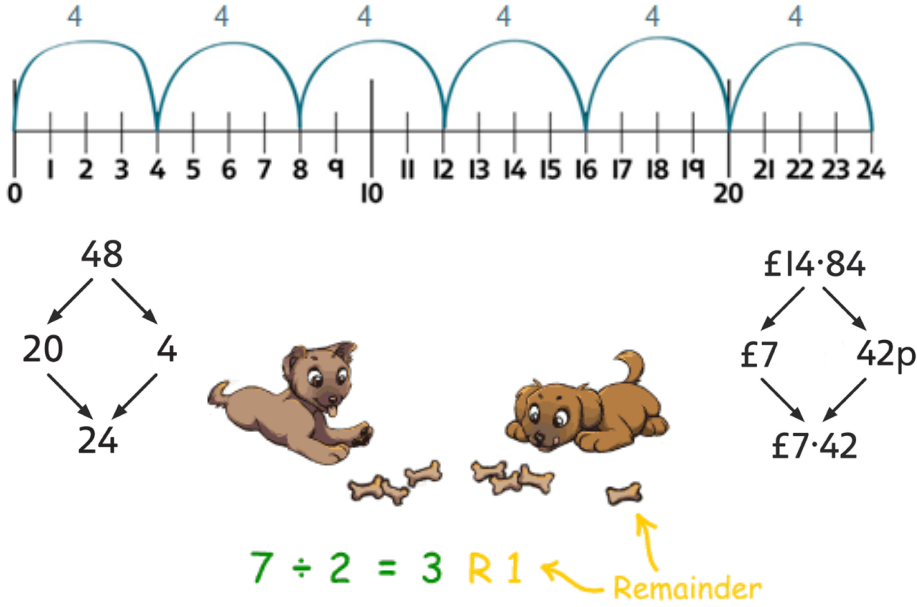
**Multiplication and division:** This key stage is also the period during which all the multiplication and division facts are memorised, including all facts up to 12 × 12. Efficient written methods for multiplying or dividing a 2-digit or 3-digit number by a 1-digit number are taught, as are mental strategies for multiplication or division with large but 'friendly' numbers, e.g. when dividing by 5 or multiplying by 20.
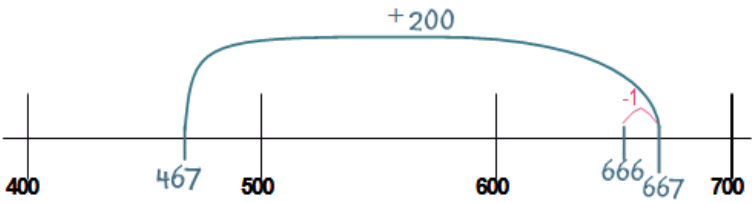
**Fractions and decimals:** Children will develop their understanding of fractions, learning to reduce a fraction to its simplest form, as well as finding non-unit fractions of amounts and quantities. The concept of a decimal number is introduced and children consolidate a firm understanding of 1-place decimals, multiplying and dividing whole numbers by 10 and 100.
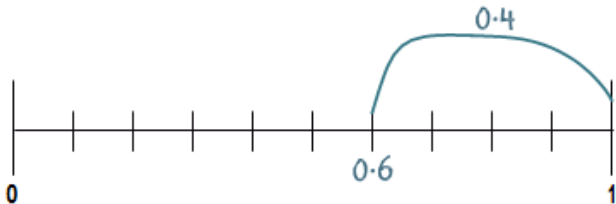
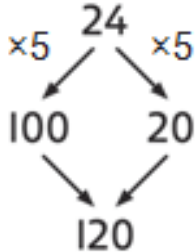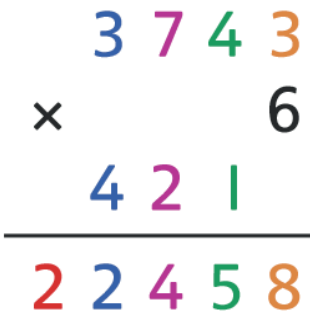| Year 3 - Addition | |
|---|---|
| **Mental methods** | Know pairs of all numbers that have a total up to 20 |
| | Know pairs of multiples of 10 with a total of 100 |
| | Add any two 2-digit numbers by counting on in 10s and 1s or by using partitioning (including problems where they need to bridge 10 or 100) |
| | Add multiples and near multiples of 10 and 100 by adding on in 10s or 100s and adding/subtracting the near multiple amount |
| | Perform place-value additions without a struggle ( *300 + 8 + 50 = 358*) |
| | Use place value and number facts to add a 1-digit or 2-digit number to a 3-digit number |
| | Add pairs of 3-digit numbers which do not bridge 10 or 100 |
| | Begin to add amounts of money using partitioning (*£6.35 +£5 as £6 + £5 + 35p*) |
| **Written methods** | Use number lines to count on in multiples of 10, 100, then units |
| | Use expanded column addition to add two or three 3-digit numbers or three 2-digit numbers |
| | Begin to use compact column addition to add numbers with 3 digits |
| | Use images to begin to add fractions with equal denominators ($^3/_8 + ^1/_8 + ^1/_8$) |
| | Use images to recognise fractions that add to 1 ($^1/_4 + ^3/_4$ , $^3/_5 + ^2/_5$) |
| **Example representations** | Counting on in 100s (*457+200 = 457, 557, 657*) |
| | Mentally partition numbers |
| |  |
| | Expanded to compact column addition:  |
| **Default skills** | Know pairs of numbers which make each total up to 10, and which total 20 |
| | Add two 2-digit numbers by counting on in 10s and 1s e.g. *56 + 35 is 56 + 30 and then add the 5* |
| | Understand simple place-value additions e.g. *200 + 40 + 5 = 245* |
| | Use place value to add multiples of 10 or 100 with ease |

| Year 3 - Subtraction | |
|---|---|
| **Mental methods** | Know complementary pairs of all numbers that have a total up to 20 (*19-6=3 14-7=7 etc.*) |
| | Subtract any two 2-digit numbers by counting up or by subtracting multiples of 10 then units (including bridging through 10 and 100) |
| | Perform place-value subtractions without a struggle (*536 – 30 = 506*) |
| | Subtract multiples and near multiples of 10 and 100 |
| **Written methods** | Use a number line to find change from £1, £5 and £10 |
| | Use counting up on a number line as an informal written strategy for subtracting pairs of 3-digit numbers |
| | Begin to use expanded column where numbers do not need to be borrowed |
| | Use images to begin to subtract like fractions ($^7/_8 - ^3/_8$) |
| **Example representations** | Counting back |
| |  |
| | Counting up |
| |  |
| **Default skills** | Know complementary pairs of numbers which total up to 20 |
| | Count up to subtract 2-digit numbers |
| | Subtract multiples from 100 by counting up |
| | Subtract multiples of 10 and 100 with ease |
| | Solve basic place value subtractions |

| Year 3 - Multiplication | |
|---|---|
| **Mental methods** | Know by heart all the multiplication facts in the ×2, ×3, ×4, ×5, ×8 and ×10 tables |
| | Multiply whole numbers by 10 and 100 |
| | Know that multiplication is commutative |
| | Use place value and number facts in mental multiplication (*30 × 5 is 15 × 10*) |
| | Begin to partition teen numbers to multiply by a 1-digit number ( *3 × 14 as 3 × 10 add 3 × 4*) |
| | Double numbers up to 50 by partitioning |
| **Written methods** | Use a number line to do repeated addition |
| | Use expanded column method to multiply 2 and 3 digit numbers by 1 digit numbers |
| **Example representations** |  |
| **Default skills** | Know by heart the ×2, ×3, x4, ×5 and ×10 tables |
| | Double given tables facts to get others |
| | Double numbers up to 25 and multiples of 5 to 50 |

| Year 3 - Division | |
|---|---|
| **Mental methods** | Know by heart all the division facts derived from the ×2, ×3, ×4, ×5, ×8 and ×10 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 (*÷ 2 is the same as halving and ÷4 is half of that*) |
| | Halve even numbers to 100, halve odd numbers to 20 |
| **Written methods** | Use informal written methods to group/share |
| | Perform divisions just above the 10th multiple using repeated subtraction on a number line |
| | Find unit fractions of quantities and begin to find non-unit fractions of quantities |
| | Know how to record answers which contain remainders |
| **Example representations** |  |
| **Default skills** | Know by heart the division facts derived from the ×2, ×3, ×5 and ×10 tables |
| | Halve even numbers up to 50 and even numbers/those which start with even numbers to 100. |
| | Perform divisions within the tables including those with remainders |
| | Begin to perform divisions just above the 10th multiple using repeated subtraction on a number line |

| Year 4 - Addition | |
|---|---|
| **Mental methods** | Add any two 2-digit numbers by partitioning or counting on (including where bridging is needed)<br>Know by heart/quickly derive number bonds to 100 and to £1<br>Add to the next 100, £1 and whole number ( *234 + 66 = 300   56p + 44p = £1 3·4 + 0·6 = 4*)<br>Perform place-value additions without a struggle<br>Add multiples and near multiples of 10, 100 and 1000 by compensating<br>Add £1, 10p, 1p to amounts of money<br>Use place value and number facts to add 1-, 2-, 3- and 4-digit numbers where a mental calculation is appropriate (*4004 + 156 by knowing that 6 + 4 = 10 and that 4004 + 150 = 4154 so the total is 4160*) |
| **Written methods** | Compact column addition for 3 and 4 digit numbers<br>Be able to add like fractions without images<br>Know fraction complements to 1 ($^2/_3 + \_ = 1$) |
| **Example representations** | Adding near multiples of 100<br><br>Compact column addition<br><br>5 3 4 7<br>2 2 8 6<br>+ 1 4 9 5<br>  1 2 1<br>―――――<br>9 1 2 8 |
| **Default skills** | Add any 2-digit numbers by partitioning or counting on<br>Number bonds to 100<br>Add 'friendly' larger numbers using knowledge of place value and number facts<br>Use column addition to add 3-digit numbers |

| Year 4 - Subtraction | |
|---|---|
| **Mental methods** | Subtract any two 2-digit numbers by counting up or back in 10s, then 1s<br>Know by heart/quickly derive number bonds to 100<br>Perform place-value subtractions without a struggle<br>Subtract multiples and near multiples of 10, 100, 1000, £1 and 10p<br>Subtract multiples of 0·1<br>Subtract £1, 10p, 1p from amounts of money |
| **Written methods** | Use a number line to find change from £10, £20 and £50<br>Use counting up on a number line as an informal written strategy where the larger number is, or is close to, a multiple of 1000<br>Use expanded column subtraction for 3- and 4-digit numbers, including borrowing<br>Begin to use compacted column subtraction for 3 digit numbers where the larger number is not a multiple of 100<br>Subtract like fractions<br>Use fractions that add to 1 to find fraction complements to 1 (e.g. $1 - \frac{2}{3} = \frac{1}{3}$) |
| **Example representations** | Using a number line<br><br><br><br>Expanded to compact column subtraction<br><br> |
| **Default skills** | Use counting up with confidence to solve most subtractions, including finding complements to multiples of 100 (*512 – 287 and  67 + _ = 100*)<br>Begin to confidently use written methods to solve more complicated subtractions |

| Year 4 - Multiplication | |
|---|---|
| **Mental methods** | Know by heart all multiplication facts up to 12x12<br>Recognise factors up to 12 of 2 digit numbers<br>Multiply whole numbers and one place decimals by 10 and 100<br>Know that multiplication is commutative<br>Multiply 1 digit numbers by multiples of 10, 100 and 1000<br>Use place value to aid mental multiplication (8xsomething is double 4xsomething is double 2x something; 5xsomething is half of 10xsomething) |
| **Written methods** | Use column multiplication to multiply 3 and 4 digit numbers by a 1 digit number<br>Use an efficient written method to multiply two 2 digit numbers (partitioning is recommended) |
| **Example representations** | To do 24 x 25:<br><br>×5  24  ×5<br>100  20<br>120<br><br>Repeat for x 20 and add together<br><br>3 7 4 3<br>×     6<br>4 2 1<br>2 2 4 5 8 |
| **Default skills** | Know by heart multiplication tables up to 10 × 10<br>Multiply whole numbers by 10 and 100<br>Use the expanded column method to multiply 3 digit by 1 digit numbers |

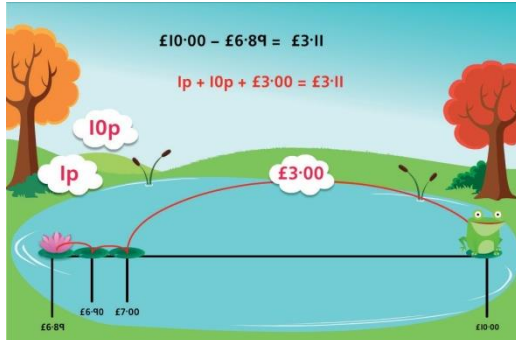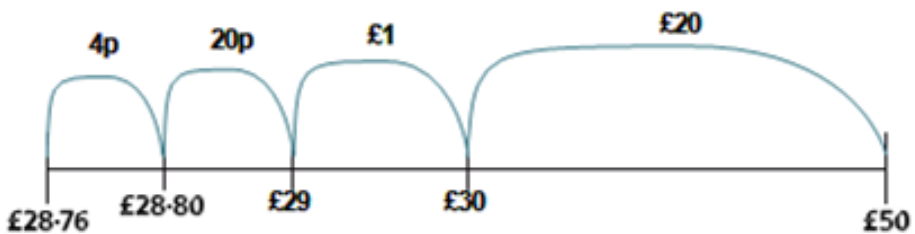| Year 4 - Division | |
|---|---|
| **Mental methods** | Know by heart all the division facts up to 144 ÷ 12 |
| | Divide whole numbers by 10, 100, to give whole number answers or answers with 1 decimal place |
| | Divide multiples of 10 and 100 by 1-digit numbers using division facts (*3200 ÷ 8 = 400*) |
| | Use place value and number facts in mental division (*245 ÷ 20 is half of 245 ÷ 10 and 245 ÷ 5 is double*) |
| | Divide larger numbers mentally by subtracting the 10th or 20th multiple as appropriate (*156 ÷ 6 can be calculated as 20 × 6 = 120 and 6 × 6 = 36*) |
| | Find halves of even numbers to 200 and beyond using partitioning |
| | Begin to halve amounts of money |
| **Written methods** | Use bus stop to divide a 2-digit or a 3-digit number by a 1-digit number |
| | Give remainders as whole numbers |
| | Begin to reduce fractions to their simplest forms |
| | Find unit and non-unit fractions of larger amounts |
| **Example representations** |  £9 ÷ 2 = £4.50 |
| **Default skills** | 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 1 decimal place |
| | Perform divisions just above the 10th multiple using bus stop |
| | Find unit fractions of amounts |

## Upper KS2

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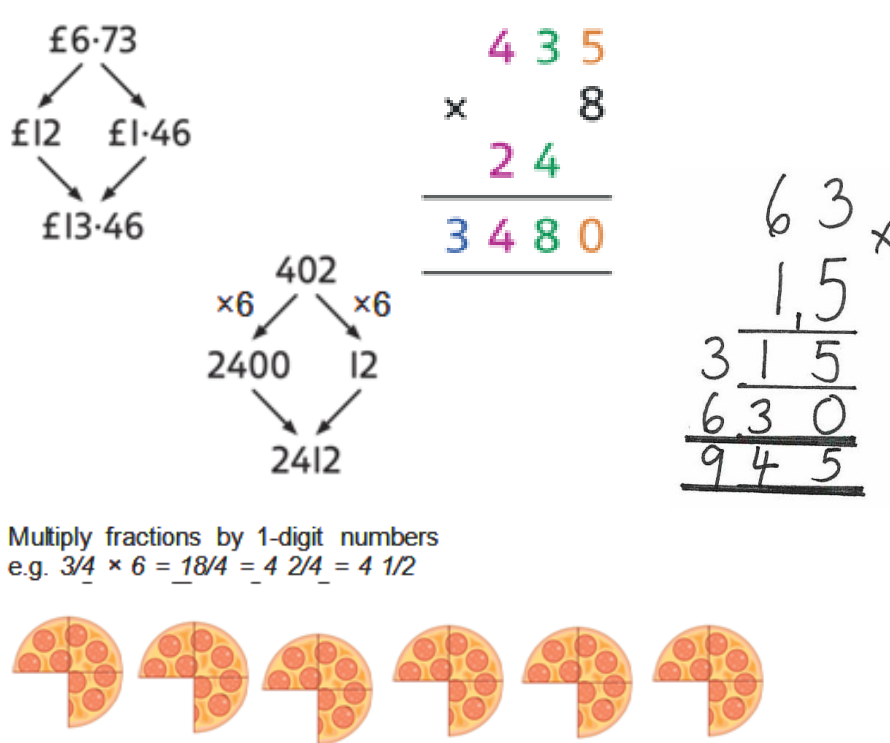
**Addition and subtraction:** Children will consolidate their use of written procedures in adding and subtracting whole numbers with up to 6 digits and also decimal numbers with up to 2 decimal places. Mental strategies for adding and subtracting increasingly large numbers will also be taught. These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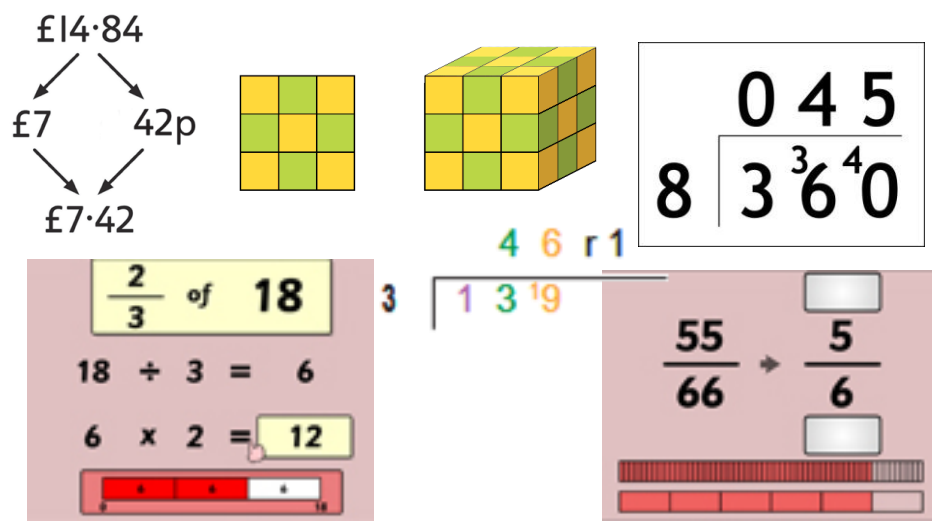
**Multiplication and division:** Efficient and flexible strategies for mental multiplication and division are taught and practised, so that children can perform appropriate calculations even when the numbers are large, such as *40 000 × 6* or *40 000 ÷ 8*. In addition, it is in Years 5 and 6 that children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

**Fractions, decimals, percentages and ratio:** 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.

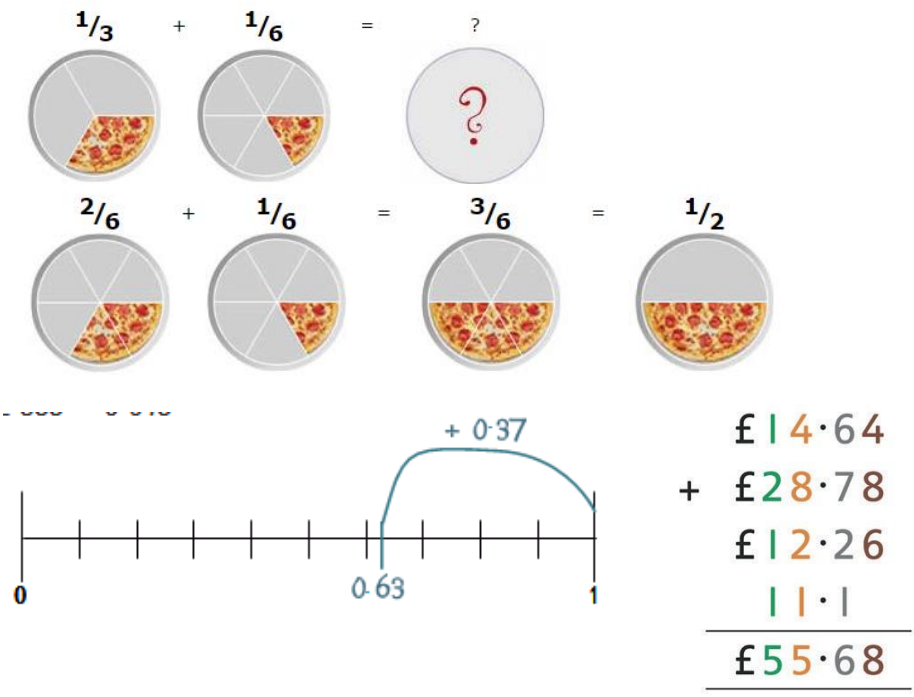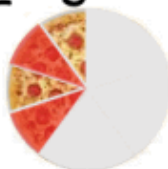| Year 5 - Addition | |
|---|---|
| **Mental methods** | Know number bonds to 1 and to the next whole number |
| | Add to the next 10 from a 1 place decimal number (*13·6 + 6·4 = 20*) |
| | Add 1- or 2-digit multiples of 10, 100, 1000, 10 000 and 100 000 |
| | Add near multiples of 10, 100, 1000, 10 000 and 100 000 to other numbers mentally (*82 472 + 30 004*) |
| | Add decimal numbers which are near multiples of 1 or 10, including money (*£6·34 + 1·99* and *£34·59 + £19·99*) |
| | Use place value and number facts to add two or more 'friendly' numbers, including money, decimals and numbers up to 4 digits (*3 + 8 + 6 + 4 + 7 ; 0·6 + 0·7 + 0·4 ; 2056 + 44*) |
| | Use partitioning to add trickier decimal numbers |
| **Written methods** | 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 |
| | Begin to add related fractions using equivalences ($\frac{1}{2} + \frac{1}{6} = \frac{3}{6} + \frac{1}{6}$) |
| | Choose the most efficient method in any given situation |
| **Example representations** |  |
| **Default skills** | Mentally add numbers with only 2 digits which are not zeros |
| | Derive swiftly and without any difficulty number bonds to 100 |
| | Add 'friendly' large numbers using knowledge of place value and number facts |
| | Use column addition to add pairs of 4- and 5-digit numbers |

| Year 5 - Subtraction | |
|---|---|
| **Mental methods** | Subtract numbers with 2 significant digits only, using mental strategies *(6·5 – 4·2 ; 72 000 – 47 000)*<br><br>Subtract 1- or 2-digit multiples of 10, 100, 1000, 10 000 and 100 000<br><br>Subtract 1- or 2-digit near multiples of 10, 100, 1000, 10 000 and 100 000 from other numbers<br><br>Subtract decimal numbers which are near multiples of 1 or 10, including money *(£6·34 – £1·99)*<br><br>Use counting up, with knowledge of number bonds to 10, 100 or £1, as a strategy to perform mental subtraction of more difficult money problems, or calculations with larger numbers*(£10 – £3·45 ; 1000 – 782)*<br><br>Recognise fraction complements to 1 and to the next whole number *(1²/₅ + ³/₅ = 2)* |
| **Written methods** | Use compact column subtraction to subtract numbers with up to 5 digits<br><br>Use a number line for subtractions where the larger number is a multiple or near multiple of 1000, money problems or decimals up to 2d.p.<br><br>Begin to use compact column subtraction to solve the above<br><br>Begin to subtract related fractions using equivalences<br>    e.g. ¹/₂ – ¹/₆ = ³/₆ – ¹/₆ = ²/₆<br><br>Choose the most efficient method in any given situation |
| **Example representations** | <br><br>e.g. £50 – £28·76<br> |
| **Default skills** | Derive swiftly and without difficulty number bonds to 100<br><br>Use counting up with confidence to solve most mental subtractions<br><br>Use a number line with confidence to solve any subtraction<br><br>Use column subtraction to subtract most numbers with up to 4 digits |

| Year 5 - Multiplication | |
|---|---|
| **Mental methods** | 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 (*43 × 6 is double 43 × 3 and 28 × 50 is $^1/_2$ of 28 × 100 = 1400*) |
| | Use knowledge of place value and rounding in mental multiplication (*67 × 199 as 67 × 200 – 67*) |
| | Partition 2-digit numbers, including decimals, to multiply by a 1-digit number mentally (*6 × 27 as 6 × 20 (120) plus 6 × 7 (42)*) |
| | Double amounts of money by partitioning (*£37·45 doubled is £37 doubled (£74) plus 45p doubled (90p) giving a total of £74·90*) |
| **Written methods** | Use short multiplication to multiply a 1-digit number by a number with up to 4 digits |
| | Begin to use long column multiplication to multiply 2 and 3-digit numbers by "friendly" 2 digit numbers (containing 2,3,4 and 5) |
| | Find 1%, 10%, 50%, 25% and 20% of amounts |
| | Begin to multiply fractions and mixed numbers by whole numbers ≤ 10 (*4 × $^2/_3$ = $^8/_3$ = 2 $^2/_3$*) |
| **Example representations** |  |
| **Default skills** | Know multiplication tables to 11 × 11 |
| | Multiply whole numbers and 2-place decimals by 10, 100 and 1000 |
| | Use knowledge of factors as aids to mental multiplication |
| | Use column method to multiply numbers with up to 4 digits by 1-digit numbers |
| | Begin to multiply two "friendly" 2 digit numbers using column methods |

| Year 5 - Division | |
|---|---|
| **Mental methods** | Know by heart all the division facts up to $144 \div 12$ |
| | 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 (*34 ÷ 5 is (34 ÷ 10) × 2*) |
| | Use knowledge of multiples and factors, as well as tests for divisibility, in mental division (*246 ÷ 6 is 123 ÷ 3, we know that 525 divides by 25 and by 3*) |
| | Halve amounts of money by partitioning |
| | Divide larger numbers mentally by subtracting the 10th or 100th multiple as appropriate (*96 ÷ 6 is 96 – 60 (10 × 6) to leave 36 (6x6) so 10x+6x=16x*) |
| | Know tests for divisibility by 10, 2, 3, 4, 5 and 25 |
| | Know how to calculate square numbers and cube numbers |
| | Reduce fractions to their simplest form |
| **Written methods** | Use bus stop division to divide a number with up to 4 digits by a number ≤ 12 |
| | Give remainders as whole numbers or as fractions |
| | Find non-unit fractions of large amounts |
| | Turn improper fractions into mixed numbers and vice versa |
| | Choose the most efficient method in any given situation |
| | Begin to understand chunking and record on a number line and in traditional style |
| **Example representations** |  |
| **Default skills** | Know by heart division facts up to $121 \div 11$ |
| | 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 | |
|---|---|
| **Mental methods** | Know by heart number bonds to 100 and use these to derive related facts (*3·46 + 0·54, 3867+33*) |
| | 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. multiples of 10, 100 and 100; decimals which contain bonds to 1; near multiples of 10) |
| | Add multiples of powers of 10 and near multiples of the same |
| | Add negative numbers in a context such as temperature where the numbers make sense |
| | Add positive numbers to negative numbers and vice versa |
| | Add two 1-place decimal numbers or two 2-place decimal numbers less than 1 (*4·5 + 6·3* and *0·74 + 0·33*) |
| **Written methods** | Use column addition to add numbers with up to 5 and 6 digits |
| | Use column addition to add decimal numbers with up to 3 decimal places |
| | Use column addition to add numbers with significantly different sizes (e.g. a 4 digit and a 2 digit, or 3 digit and 2 place decimal) |
| | Use column addition to add 'tricky' whole numbers and decimals |
| | Add mixed numbers and fractions with different denominators |
| **Example representations** |  |
| **Default skills** | Derive, swiftly and without difficulty, number bonds to 100 |
| | Use place value and number facts to add 'friendly' large or decimal numbers |
| | Use column addition to add numbers with up to 5-digits |
| | Use column addition to add pairs of 2-place decimal numbers |

| Year 6 - Subtraction | |
|---|---|
| **Mental methods** | Use number bonds to 10, 100 and 1000 to perform mental subtraction of any pair of integers by complementary addition (*4000 – 654 as adding 46, then 300, then 3000*)<br><br>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 (*10 – 3·65 as adding 0·35 then 6; £50 – £34·29 as adding 71p then £15*)<br><br>Use number facts and place value to perform mental subtraction of large numbers or decimal numbers with up to 2 places<br><br>Subtract multiples of powers of 10 and near multiples of the same<br><br>Subtract a mix of positive and negative numbers in a context such as temperature where the numbers make sense |
| **Written methods** | Use compact column subtraction to subtract numbers with up to 6 digits, including those where the largest number is a multiple or near multiple of 100, 1000 or 10, 000 and for decimals up to 3 places.<br><br>Use a number line to calculate time intervals, bridging through 60mins/1 hour<br><br>Subtract mixed numbers and fractions with different denominators |
| **Example representations** |  |
| **Default skills** | Use number bonds to 100 to perform mental subtraction of numbers up to 1000 by complementary addition<br>    e.g. *1000 – 654 as 46 + 300 in our heads*<br><br>Use complementary addition for subtraction of integers up to 10 000<br>    e.g. *2504 – 1878*<br><br>Use complementary addition for subtractions of 1-place decimal numbers and amounts of money<br>e.g. *£7·30 – £3·55* |

| Year 6 - Multiplication | |
|---|---|
| **Mental methods** | Know by heart all the multiplication facts up to 12 × 12<br>Multiply whole numbers and decimals with up to 3 places by 10, 100 or 1000<br>Use place value and number facts in mental multiplication (*4000 × 6 = 24 000 0·03 × 6 = 0·18*)<br>Use doubling and halving as mental multiplication strategies, including to multiply by 2, 4, 8, 5, 20, 50 and 25<br>Use rounding in mental multiplication (*34 × 19 as (34 × 20) – 34*)<br>Multiply 1- and 2-place decimals by numbers up to and including 10 using place value and partitioning (*3·6 × 4 is 12 + 2·4 and 2·53 × 3 is 6 + 1·5 + 0·09*)<br>Double numbers with up to 4 digits and decimal numbers with up to 2 places using partitioning |
| **Written methods** | Use column multiplication to multiply up to a 4 digit number by any 1 or 2 digit number<br>Use short column multiplication to multiply a whole number by a number with 1 or 2 decimal places, including amounts of money<br>Multiply fractions and mixed numbers by whole numbers<br>Calculate simple percentages |
| **Example representations** |  |
| **Default skills** | Know by heart all the multiplication facts up to 12 × 12<br>Multiply whole numbers and 1- and 2-place decimals by 10, 100 and 1000<br>Use column multiplication to multiply up to a 4 digit number by any 1 digit number<br>Use column multiplication to multiply a 2 digit number by any 2 digit number, and begin to use it to multiply larger numbers by 2 digit numbers |

| | **Year 6 - Division** |
|---|---|
| **Mental methods** | 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 |
| | 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 (*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 (*2·4 ÷ 6 = 0·4 ; 0·65 ÷ 5 = 0·13 ; £6·33 ÷ 3 = £2·11*) |
| | Halve decimal numbers with up to 2 places using partitioning |
| | 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 |
| **Written methods** | Use short bus stop division to divide a number with up to 4 digits by a 1-digit number up to 12 |
| | Use chunking to divide 3-digit and 4-digit numbers by 'friendly' 2-digit numbers |
| | Give remainders as whole numbers, fractions or decimals |
| | Divide a 1-place or a 2-place decimal number by a number ≤ 12 using bus stop |
| | Divide proper fractions by whole numbers |
| **Example representations** |  |
| **Default skills** | 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 |
| | Divide a 1-place decimal by a number ≤ 10 using place value and knowledge of division facts |
| | Use bus stop division and chunking to solve most division problems |