St John's Upper Holloway CE Primary School

Calculation Policy

KS1 / KS2

September 2019

Calculation Policy
Approved Oct 2019

To be reviewed Oct 2020

Our Vision
Jesus said: 'Love each other as I have loved you'. John 15:12
As we are loved, so we shall love.
As we are taught, so we shall teach.
As we are nurtured, so we shall flourish.

Our Mission
St John's is a small, caring Church of England Primary School. It is committed to supporting our pupils to be happy, successful and fulfilled throughout their lives. We believe that everyone is unique and valued by God. We aspire to be a high achieving school that provides an outstanding education:

- promoting the highest standards of teaching and learning, with excellent leadership
- being inclusive, celebrating diversity and valuing all religions, faiths, cultures and backgrounds
- providing a rich and stimulating curriculum that will inspire and challenge
- being a happy, healthy and safe place
- providing excellent care, guidance and support with a strong partnership between school, parents and the community.

We seek to promote six Christian values of creativity, thankfulness, truthfulness, friendship, perseverance and courage, each linked by our core value of love. We believe these help to prepare our children for a successful and fulfilling life, so being:

- considerate and respectful with excellent manners
- confident, happy, independent and self-motivated
- co-operative and collaborative
- honest and trustworthy
- resilient, hardworking and determined
- highly principled with moral, spiritual, cultural and social awareness, including shared British Values.

Approved by staff _____ (head) on _____ (date)

Approved by governors _____ (chair of C&S committee) on _____ (date)

Introduction

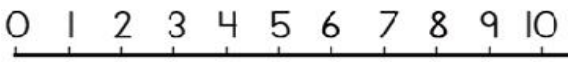
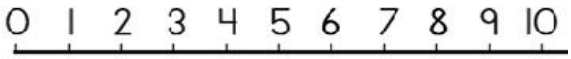
At St John's Upper Holloway we aim to develop confidence, enthusiasm, resilience and enjoyment in maths learning. To ensure the best outcomes for all children we use a broad range of approaches to learning calculations with an emphasis on the use of concrete objects and visual images as models to develop fluency and conceptual understanding. These help children to develop mental pictures as a step from counting to calculation and will include: Dienes blocks, cubes, counters, number lines, 100 squares. Fluency in mental strategies and quick recall of facts need to be established **before** using a formal written method, but informal jottings and a recorded mental method can help create a bridge between mental and written methods so that each stage of the written method is clearly understood. Children build up their knowledge year on year which helps them approach calculations confidently.

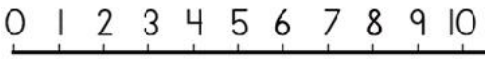
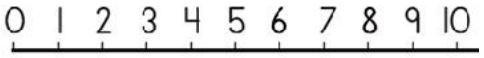
KS1 Overview

Children in Years 1 and 2 will be given a solid foundation in the basic building blocks of mental and written arithmetic. The teaching of place value will help them to develop a good understanding of how numbers work so they are confident with recognising and writing 2-digit numbers and are beginning to recognise numbers greater than 100. A focus on number bonds using manipulatives and a range of visual images and memorisation techniques provides a good grounding and ensures that all children leave Year 2 knowing at least the pairs of numbers which make all the numbers to 10 and having been taught pairs to 20. This knowledge provides children with the tools to add single digit numbers and to add/subtract a single digit number to/from a 2-digt number. Their ability to add/subtract 1 or 10 and to understand which digit changes and why is another important conceptual tool. This understanding is extended to enable children to add and subtract multiples of ten to and from any 2-digit number. The most important application of his knowledge is their ability to add or subtract any pair of 2-digit numbers by counting on/back in tens and ones. Children may extend this to adding by partitioning numbers into tens and ones.

They will be taught to count in 2s, 3s, 5s and 10s, and will relate this skill to repeated addition. They will have met and begun to learn the associated 2x, 3x, 5x and 10x 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. They 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 will be introduced as numbers and as operators, specifically in relation to halves, quarters and thirds.

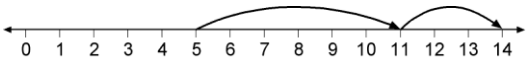
Year 1

Addition steps	Example
Count on a number line to add	*What is the number after 9? Show me on this number line.* 
Develop quick recall of addition facts to 5, using the symbols + and =	*2 + 3 = __* *2 + 1 = __* *3 + 1 = __*
Use strategy of holding the first number in the head and counting on to add	*What is 4 add 3?* *Show me on this number line how you hold the 4 in your head and count on.* 
Understand the commutative law for addition	*What can you tell me about 3 + 4 and 4 + 3? Show me with these rods.*
Know the number bonds that total 10	*0+10 1+9 2+8 3+7 4+6 5+5*
Develop quick recall of addition facts to 10	*5 + 3 = __* *2 + 7 = __* *6 + 4 = __*
Use doubles and near-doubles for addition facts to 10	*How can 4 + 4 = 8 help you work out 4 + 5?*
Calculate the value of a missing number in an addition to 10	*3 + __ = 7* *__ + 4 = 9* *5 + 5 = __*
Produce number stories involving addition to 10	*Use five toy cars and a garage to make different number stories like this: One car is in the garage and four cars are outside, which is five altogether. One added to four makes five.*
Say a number that is one more than any number to 20	*There are twelve counters in the pot. How many will there be if I put in one more?*
Know the number bonds that total 20	*How many different pairs of numbers can you remember that have a total of 20? How can you be sure you have got them all?*

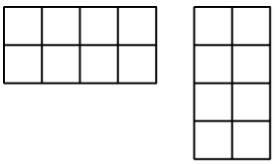
Use doubles and near-doubles for addition facts to 20	*If you know that 6 add 6 equals 12, how can this help you work out 6 add 7?*
Develop quick recall of addition facts to 20	*7 + 6 = __* *4 + 8 = __* *9 + 5 = __*
Calculate the value of a missing number in an addition to 20	*7 + __ = 15* *__ + 4 = 12* *11 + 5 = __*
Subtraction steps	**Example**
Count back on a number line to subtract	*What is 2 less than 5? Show me on this number line.* 
Develop quick recall of subtraction facts to 5, using the symbols - and =	*5 - 3 = __* *4 - 1 = __* *3 - 2 = __*
Find the difference between two sets of up to 10 objects	*Count the number of cubes in each bag. Find the difference between the number of cubes to work out how many more are in this bag.*
Find the difference between numbers to 10 by counting on a number line	*What is the difference between 6 and 9? Show me how you worked it out on this number line.* 
Develop quick recall of subtraction facts to 10	*8 - 3 = __* *6 - 5 = __* *9 - 6 = __*
Understand the inverse relationship between addition and subtraction	*Look at this addition: 5 + 3 = 8* *Can you make a subtraction sentence using those numbers?*
Use inverse relationship to solve missing number calculations to 10	*What number goes in the box to make this calculation correct? □ - 6 = 2* *How do you know?*
Produce number stories involving subtraction to 10	*Here are some cubes. Show me how to use them to work out nine take away four. How could you record that as a number sentence? Can you make up a number story for this?*
Say a number that is one less than any number to 20	*What is one less than fourteen?*

Find the difference between numbers to 20 by counting on a number line	*Make up a question that uses the words difference between and tell me how to do it.* *Can you use the number track to work out the difference between 15 and 8?* *If I start at 7 and count 8 more squares along the number track, where will I stop?*
Multiplication steps	**Example**
Group objects in twos and count groups	*Group these counters in twos. How many groups are there?* *How many counters are there altogether?*
Count in steps of 1, 2 and 10	*How far can you count in twos?* *20, 30, 40... Count on to 50.*
Recall the doubles of numbers to 10	*Roll this die and double your number. What score do you get?* *Look at these domino doubles. How many spots are there altogether?*
Count groups of objects to multiply – repeated addition	*How many 2p coins make 20p?* *How many socks are there altogether in these eight pairs?* *How many fingers are there altogether on six hands?*
Count in twos, fives and tens and derive the multiples of these numbers	*My sequence has these numbers in it: 10, 15, 20, 25… What numbers come next in the sequence?* *Show me the multiples of 2 on this number grid.*
Division steps	*Example*
Group objects into twos to divide	*Here are 12 counters. Put them into groups of 2. How many groups are there?*
Group objects into 2s, 3,s, 4s etc and count groups to divide – repeated subtraction	*How many 2p coins make 20p?* *Put these 20 animals in groups of 5. How many groups did you make? Show me how you did it.*

Year 2

Addition steps	Example
Produce number stories involving addition to 20	*Look at this number sentence: ☐ + ☐ = 20* *What could the missing numbers be?* *Make up a story for your missing numbers.*
Add three or more numbers	*Look at the number line. It shows the sum that Jasmine did.*  *Which of these sums did Jasmine do?* *5 + 7 + 2 = 14* *5 + 6 + 3 = 14* *5 + 5 + 4 = 14* *5 + 8 + 1 = 14* *Find the missing number: 10 + ☐ + 25 = 55*
Recall addition facts for multiples of 10 to 90	*I think of a number and add 30. The answer is 70. What is my number?*
Add tens and units together and relate to place value	*Show me 30 + 7 using the Dienes material*
Use mental strategies for TU + U without crossing the tens	*Explain how you worked these out:* *24 + 5 = __* *36 + 3 = __*
Use mental strategies for TU + U up to and then crossing the tens	*What is 17 + 8? What number facts might you use to help you work this out? How could you show that on a number line?*
Use mental strategies for TU + T up to 100	*What is 37 + 50? How did you work this out? Could you write something or use apparatus to help you explain?*
Use mental strategies for TU + T over 100	*Show me how to find the total of 79p and 50p.*
Use mental strategies for TU + TU up to 100	*How do you work out 35 + 24? What about 46 + 28?*
Use mental strategies for TU + TU over 100	*Show me how you worked out 15 more than 85.*
Calculate the value of a missing number in a mental addition	*What number goes in the box to make this calculation correct? ☐ + 12 = 27* *How do you know?*

Use a formal written method for TU+TU	*Example 1* *5 4* *+ 3 3* *8 7* *1. Add the ones* *4+3 = 7* *5 4* *+ 3 3* ***7*** *2. Add the tens* *50+30 = 80* *5 4* *+ 3 3* ***8 7*** *Example 2* *28 + 35* → *20 + 8* *8 + 5 = 13* *+ 30 + 5* *20 + 30 = 50* *50+* ***50 + 13 = 63*** *13*
Subtraction steps	**Example**
Develop quick recall of subtraction facts to 20	*Look at this number sentence: □ - □ = 8* *What could the missing numbers be?*
Use inverse relationship to solve missing number calculations to 20	*What number goes in the box to make this calculation correct? □ - 7 = 8* *How do you know?*
Produce number stories involving subtraction to 20	*Make up a number story for 14 – 8.*
Recall subtraction facts for multiples of 10 to 90	*Alice and Ben play a game. Alice scores 90 points. Ben scores 60 points. How many more points does Alice score than Ben?*
Subtract tens from 2-digit numbers	*What is 57 take away 30? How did you work it out?*
Use mental strategies for TU – U without crossing the tens	*What is 68 subtract 5? How did you work it out?*
Use mental strategies for TU – TU without crossing the tens	*What is 76 subtract 41? How did you work it out?*
Subtract units from tens	*How would you work out 30 subtract 6? Show me on a number line.*
Use mental strategies for TU – U up to and then crossing the tens	*Rachel spent 64p. She spent 8p more than Sam. How much did Sam spend? What calculation is needed? How did you decide? How did you record it?*

Use mental strategies for TU – TU crossing the tens	*What is 53 subtract 28? How did you work it out?* *What is the difference between 39 and 62? Use a number line to show your method.*
Calculate the value of a missing number in a mental subtraction	*What number goes in the box to make this calculation correct? 48 - □ = 27* *How do you know?*
Use a formal written method for TU-TU	*What is 67 subtract 35?* *60 + 7* *- 30 + 5* *30 + 2* *1. Subtract the ones 7-5* *6 7* *- 3 5* ***2*** *2. Subtract the tens 60-30* *6 7* *- 3 5* ***3 2***
Multiplication steps	**Example**
Double numbers to 20	*Roll these two dice and add the numbers together. Now double your number. What score do you get?*
Use arrays to represent multiplication	*Here are 20 counters. How could you arrange them in equal rows?* *How could you use a number sentence to show your arrangement?*
Understand the x sign as 'multiplied by': 4+4+4 = 4x3	*4 + 4 + 4 + 4 + 4 = 20* *Write this addition fact as a multiplication fact.* *□ × □ = □*
Understand the commutative law for multiplication, 4x5 = 5x4	*Look at these diagrams:*  *Is 2 × 4 the same as 4 × 2? How do you know?*
Develop quick recall of multiplication facts for 2, 5 and 10	*Write a list of the tables facts you can say quickly.* *Can you use any of these to help you learn others?*
Recognise multiples of 2, 5 and 10 to the tenth multiple	*Which are the multiples of 2 in this list?* *13, 4, 12, 8, 19, 16*

Calculate the value of a missing number in a number sentence, such as 3 x _ = 30	*What are the missing numbers?* *□ × 2 = 16* *10 × □ = 40* *□ × ◇ = 20* *How do you know?*
Recognise multiples of 2, 5 and 10 beyond the tenth multiple	*Draw rings around all the multiples of 5.* *55, 60, 54, 67, 80* *How do you know they are multiples of 5?*
Division steps	**Example**
Understand the ÷ sign as 'divided by' and 'groups of' 12 ÷ 3 = 4 groups of 3	*Show me on a number line how you could do: 14 ÷ 2, 15 ÷ 3, 20 ÷ 5* *15 pencils are grouped in threes. How many groups are there? Explain how you worked it out.*
Halve numbers to 20	*I'm thinking of a number. If I halve it my answer is 9. What number was I thinking of? Explain how you know. Is this the same as 18÷2=9?*
Understand the inverse relationship between multiplication and division	*What multiplication and division facts can you make from the numbers 2, 8 and 16?*
Understand that division is not commutative	*Is it always, sometimes or never true that 10÷2 gives the same answer as 2÷10? Show me how you know*
Develop quick recall of division facts for 2, 5 and 10	*Which tables facts help you to work out 30 divided by 5?*
Use practical methods to divide with remainders	*I have 22 counters here that I want to divide equally between 5 children. Show me what 22 ÷ 5 means with these counters.*
Calculate the value of a missing number in a number sentence	*What are the missing numbers?* *□ × 2 = 12* *20 ÷ □ = 4* *□ ÷ 2 = 10* *How do you know?*

Lower KS2 Overview

In lower KS2, children build on the concrete and conceptual understandings they have gained in KS1 to develop a deep 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 the infants. 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.

Year 3

Addition steps	Example
Use mental strategies to add ones, tens and hundreds to a 3-digit number	*What is 268 add 50? How did you work it out?*
Use a formal written method for HTU+TU	*What is 348 add 79?* *1 1* *3 4 8* *+ 7 9* *4 2 7* *Step 1* *8+9=17* *Partition 17 into 10 and 7. Write the 7 in the ones column and write the 1 ten under the tens column.* *Step 2* *10+40+70 =120* *Partition 120 into 100 and 20. Write 2 tens in the tens column and write the 1 hundred under the hundreds column.* *Step 3* *100+300 = 400* *Write the 6 hundreds in the hundreds column*

Use a formal written method for HTU+HTU	*What is 348 added to 279?* *1 1* *3 4 8* *+ 2 7 9* *6 2 7* *Step 1* *8+9=17* *Step 2* *10+40+70 =120* *Step 3* *100+300+200=600*
Use a formal written method for adding 4-digit numbers	*What is 6879 add 1905?* *1 1 1* *6 8 5 9* *+ 1 9 0 5* *8 7 6 4*
Use a formal written method to add money using decimal notation to tenths	*What is the total of £16.40 and £23.90?* *1 1* *£ 1 6 . 4 0* *+ £ 2 3 . 9 0* *£ 4 0 . 3 0*
Subtraction steps	**Example**
Use mental strategies to subtract ones, tens and hundreds from a 3-digit number	What is 345 subtract 90? How did you work it out?
Use a formal written method for TU-TU with exchange	*What is 74 subtract 35?* $^{6}\not{7}^{1}4$ - 3 5 9 ***Step 1*** *Exchange and rename 70 + 4 as 60 + 14* *14 – 5 = 9* $^{6}\not{7}^{1}4$ - 3 5 3 9 ***Step 2*** *60 – 30 = 30*

Use a formal written method for HTU-HTU	*What is 734 subtract 385?* $7\ {}^{2}\cancel{3}\ {}^{1}4$ $-\ 3\ 8\ 5$ $\quad\ 9$ ***Step 1*** *Exchange and rename 30 + 4 as 20 + 14* *14 – 5 = 9* ${}^{6}\cancel{7}\ {}^{12}\cancel{3}\ {}^{1}4$ $-\ 3\ 8\ 5$ $\quad\ 4\ 9$ ***Step 2*** *Exchange and rename 700 + 20 as 600 + 120* *120 – 80 = 40* ${}^{6}\cancel{7}\ {}^{12}\cancel{3}\ {}^{1}4$ $-\ 3\ 8\ 5$ $3\ 4\ 9$ ***Step 3*** *600 – 300 = 300*
Multiplication steps	**Example**
Develop quick recall of multiplication facts for 3 and 4	*Write the missing numbers in the boxes.* *6 × 4 = 12 × □* *□ × 3 = 6 x 5*
Recognise multiples of 3 and 4 beyond the tenth multiple	*Is 82 a multiple of 4? How do you know?*
Use practical and informal methods to multiply 2-digit numbers by 2, 3, 4, 5	*Rulers are 30 cm long. If you place six of them end to end, how long a line will they make?* *Explain how you solved this problem. Did you write anything down?*
Understand the effect of multiplying by 0 and by 1	*What do you notice when you multiply any number by 1?* *Is it always, sometimes or never true that when you multiply a number by zero, the answer is zero?*
Use a written method for TUxU	*How would partitioning help you to calculate 27 × 6?* *What is 46 x 5?* *6x5=30* *40x5=200* *200+30 = 230* ${}^{3}4\ 6$ $\times\ 5$ $2\ 3\ 0$
Develop quick recall of multiplication facts for 6 and 8	*What is 8 × 4? Did you know or did you work thorough one of the times tables? Which table did you use?*

Division steps	Example
Develop quick recall of division facts for 3 and 4	*I am thinking of a number. I divide it by 4 and the answer is 8. What is my number?*
Use practical and informal methods to divide 2-digit numbers by 2, 3, 4, 5	*Answer this: 65 ÷ 5 = ☐* *Explain how you solved this.* *You are given that 10 × 3 = 30 and 3 × 3 = 9. How many threes are there in 39?*
Use a written method for TU ÷ U, rounding remainders up or down	*35 crayons are shared fairly into three pots. How many crayons are in each pot? How did you decide on your answer?*
Develop quick recall of division facts for 6 and 8	*What is 24 ÷ 6? Can we check this with a multiplication?*

Year 4

Addition steps	Example
Use a formal written method to add units of measure using decimal notation to tenths	*What is the total weight of two crates weighing 345.6 kg and 297.8 kg?* *1 1 1* *3 4 5 . 6 kg* *+ 2 9 7 . 8 kg* *6 4 3 . 4 kg*
Use a formal written method to add money using decimal notation to hundredths	*What is the total of £16.49 and £23.96?* *1 1 1* *£ 1 6 . 4 9* *+ £ 2 3 . 9 6* *£ 4 0 . 4 5*
Use a formal written method to add units of measure using decimal notation to hundredths	*What is 56.89 m added to 38.75 m?* *1 1 1* *5 6 . 8 9 m* *+ 3 8 . 7 5 m* *9 5 . 6 4 m*

Subtraction steps	Example
Use a formal written method for subtracting 4-digit numbers	*What is 2734 subtract 1385?* $2^{6}\cancel{7}^{12}\cancel{3}^{1}4$ - 1 3 8 5 1 3 4 9
Use a formal written method to subtract money using decimal notation to tenths	*What is the difference in price between two bags costing £18.60 and £32.10?*
Multiplication steps	**Example**
Recognise multiples of 6, 8 and 9 beyond the tenth multiple	*Use a venn diagram to show multiples of 6 and multiples 9.* *Choose 12 numbers between 80 and 120.*
Multiply together three single-digit numbers	*What is 3 x 8 x 4?* *How did you work it out?*
Develop quick recall of multiplication facts for 11 and 12	*If you know that 10 x 8 = 80, how can you use this to help learn 12 x 8?* *What patterns are there in the 11x table?*
Know all multiplication facts to 12x12	*Which tables facts up to 12 x 12 do you still need to learn?* *What strategies could you use to learn them?*
Multiply by multiples of 10 mentally	*If 4 × 6 = 24, what is 40 × 6 and 400 × 6?* *How could you quickly work out the answer to 3 × 80?*
Use known facts to find unknown facts	*How could you calculate 15 x 20?* *What about 14 x 12?*
Use a written method for HTUxU	*$^{5}3\ ^{2}8\ 4$* *x 6* *2 3 0 4*
Division steps	**Example**
Develop quick recall of division facts for 11 and 12	*If you know that 80 ÷ 10 = 8, how can you use this to help learn 96÷ 8?*

Know all division facts by using the multiplication facts to 12x12	*Which division facts do you still need to learn?* *What strategies could you use to learn them?*
Divide by multiples of 10 mentally	*What is 300 divided by 30? How did you work it out?*
Use known facts to find unknown facts	*What is half of 72? How did you work it out? Is there a different way to do it? What is half of 720? Half of 7200? How do you know?*
Use a written method for HTU÷U, including remainders	*What is 168 divided by 3?* *Estimate: 180 ÷3 = 60* *5 6* *3/1 6 8* *- 1 5 0* *(50x3)* *1 8* *1 8* *(6x3)* *0 0* *168÷3 = 56*

Upper KS2 Overview

Children move on from dealing predominantly with whole numbers to performing arithmetic operations with both decimals and fractions. They 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 two 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. 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 x 6 or 40,000 ÷ 8. In addition, it is in Y5 and Y6 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, and they will also calculate simple percentages and ratios. Negative numbers will be added and subtracted.

Year 5

Addition steps	Example
Use a formal written method to add larger numbers	*What is 6879 add 1905?* *1 1* *6 8 5 9* *+ 1 9 0 5* *8 7 6 4*

Add numbers mentally with increasingly large numbers	*How do you work out 2380 + 600? What about 4009 + 75?*
Add fractions with the same denominator	*What is 3/8 + 3/8? Can you write the fraction in a different way?*
Use a formal written method to add decimals to thousandths	*What is 56.893 kg added to 38.755 kg?* *1 1 1* *5 6 . 8 9 3 kg* *+ 3 8 . 7 5 5 kg* *9 5 . 6 4 8 kg*
Subtraction steps	**Example**
Use a formal written method to subtract units of measure using decimal notation to tenths	*What is 38.60 litres subtract 19.50 litres?*
Use a formal written method to subtract money using decimal notation to hundredths	*What is the difference in price between two coats costing £39.45 and £53.12?*
Use a formal written method to subtract units of measure using decimal notation to hundredths	*What is the difference in weight between two sacks weighing 13.65kg and 22.08kg?*
Use a formal written method to subtract larger numbers	*A car is driven 13458 km in one year. The following year it is driven for 18906 km. How many more kilometres has been driven in the second year?*
Subtract numbers mentally with increasingly large numbers	*What is the difference between in age between someone born in 1968 and someone born in the year 2000?*
Subtract fractions with the same denominator	*I have 3 cakes that I cut into quarters. If I take 7 of the quarters, how much cake is left?* *What is 7/8 - 3/8?*

Multiplication steps	Example
Use a written method for TUxTU	*There are 12 pencils in a box. A school buys 24 boxes. How many pencils does the school buy?* *24* *x 12* *48* *240* *288*
Use a written method for HTUxTU	*What is 584 x 46?* *1* *Estimate: ≈ 600 x 50 ≈ 30 000* *$^{3}5^{2}84$* *x46* *3 504* *23 360*
Solve scaling problems, including those involving rates	*How many times bigger is 2400 than 6? How do you know?* *A model car is 1/50 of real size. If the model is 47cm long, what is the length of the real car?*
Multiply proper fractions and mixed numbers by whole numbers	*Show me how you would work out 12 multiplied by 1 ½*
Division steps	**Example**
Use a written method for ThHTU ÷ U, including remainders	*How many 5s in 1382?* *2 7 6 r 2* *5 / 1 $_{1}$3 $_{3}$8$_{3}$2*
Use tests of divisibility to recognise multiples of 2, 3, 4, 5, 6, 8, 9 and 10	*Explain the rule of divisibility for multiples of 6. How do you know if 414 is a multiple of 6?*
Solve scaling problems, including those involving rates	*A car is drawn at a scale of 1:50. If the actual car is 3m 50cm in length, what is the length of the drawn car?*

Interpret remainders in division as whole numbers, fractions or by rounding	*A farmer collects 349 eggs and puts them into egg boxes that hold 6 eggs. All the eggs must be in an egg box. How many egg boxes will he need?* *A group of 5 people win a prize of £6142 and share it between them. How much do they each get?*

Year 6

Addition steps	**Example**
Use brackets in calculations and know the order of operations	*Answer these:* *(15 + 8) x (12 - 6) =* *(9 + 15) – (3 x 2) =*
Add fractions with different denominators	*What is 3/5 + 2/3? Explain the method you used to work it out.*
Subtraction steps	**Example**
Use a formal written method to subtract decimals to thousandths	*Write the missing digits in this subtraction:* *5 3 5 . 2 3 ** *- 1 * 8 . 3 8 4* *3 6 6 . 9 * 3*
Use brackets in calculations and know the order of operations	*Answer these:* *(15 – 8) x (7 + 6) =* *(9 + 15) – (8 ÷ 2) =*
Find the difference between positive and negative numbers or two negative numbers	*Tell me two temperatures that lie between 0 °C and –8 °C. Which is the higher? How can you tell? What is the difference between the higher temperature and –8 °C?*
Subtract fractions with different denominators	*What is 4 ¼ - 2 ½ ? Explain the method you used to work it out.*
Multiplication steps	**Example**
Factorise large numbers to help multiply	*How can you use factors to multiply 17 by 12?*
Use a written method for ThHTU x TU	*Show the method you would use to multiply 4835 by 38.*

Know the order of operations to calculate with brackets	*Answer these:* *(17x4) + (121÷11) =* *(8+3) x (7+9) =*
Use a written method to multiply numbers with up to two decimal places	*Multiply 0.07 by 0.6.*
Use diagrams to help multiply pairs of proper fractions	*Show me how you could answer ¾ x ½*
Division steps	**Example**
Factorise numbers to help divide	*How can you use factors to divide 96 by 12?*
Know the order of operations to calculate with brackets	*Answer these:* *(17x4) + (121÷11) =* *(8+3) x (81÷9) =*
Use a written method for ThHTU ÷ TU, including remainders	*Show the method you would use to divide 1749 by 16.*
Calculate and interpret the mean as an average	*Carol counts the matches in 10 boxes. She works out that the mean number of matches in a box is 51. Here are her results for 9 boxes.* Number of matches in a box 48: ✔ ✔ ✔ 49: ✔ ✔ 50: ✔ 51: ✔ 52: ✔ 53: 54: ✔ ✔ *Calculate how many matches are in the tenth box.*
Use a written division method for money and measures with an answer up to two decimal places	*A piece of wood is 3.25 m long. I use all the wood to make five shelves of equal length. How long is each shelf in metres? In centimetres?*
Use diagrams to help divide proper fractions by whole numbers	*Show me how you could answer ½ ÷ ¼*