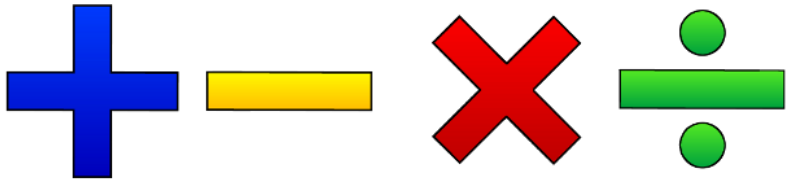
Holly Primary School

Mathematics

Calculation policy



Holly Primary School – Calculation policy guidance

The following calculation policy has been devised to meet requirements of the National Curriculum 2014 for the teaching and learning or mathematics. It is designed to give pupils a consistent and smooth progression of learning in calculations across school. Please note that early learning in number and calculation in Foundation follows the Early years foundation stage profile document and this calculation policy is designed to build on progressively from the content and methods established in the Early Years Foundation Stage.

Age stage expectations

The calculation policy is organised according to age stage expectations as set out in the National Curriculum 2014, however it is vital that pupils are taught according to the stage that they are currently working at. Teacher judgement must be used to decide if a child needs to look at previous year group expectations until they are secure enough to move on. If a child is working above age expectations, teachers must make sure knowledge is embedded in 'word problems' or 'problem solving' activities.

Providing a context for calculations

It is important that any type of calculation is given a real life context or problem solving approach to help build children's understanding of the purpose of calculation and to help them recognise when to use certain operations and methods when faced with problems. Teachers are encouraged to use 'Headstart' and 'Maths no problem' text books to support.

Choosing a calculation method

Children need to be taught and encouraged to use the following processes in deciding what approach they will take to a calculation; to ensure they select the most appropriate method for the numbers involved.

Year 1

Addition

Add with numbers up to 20

+ = signs and missing numbers

Children to interpret addition number sentences and solve missing box problems, using concrete objects and number line addition to solve them:

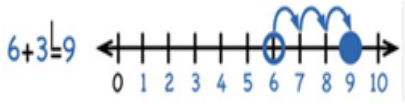
3 + 4 = ☐ ☐ = 3 + 4

3 +☐ = 7 7 = ☐ + 4

☐ + 4 = 7 7 = 3 + ☐

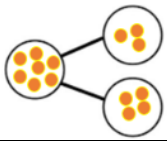
Promote covering up of operations and numbers.

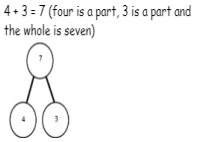
Number lines (numbered)



Record by - drawing jumps on prepared lines.

Introduce part-whole model



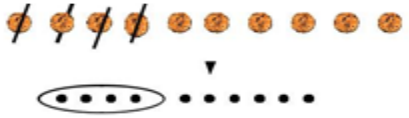


Subtraction

Subtract with numbers up to 20

Pictures and symbols

Sam spent 4p. What was his change from 10p?



- = signs and missing numbers

Children to read, write and interpret number sentences with – and = signs.

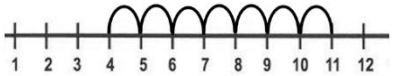
7 – 3 = ☐ ☐ = 7 - 3

7 - ☐ = 4 4 = ☐ - 3

☐ -3 = 4 4 = 7 - ☐

Number lines (numbered)

11 – 7 (Counting back)



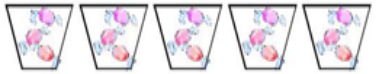
The difference between 7 and 11 (counting up)

Multiplication

Multiply with concrete objects, arrays and pictorial representations.

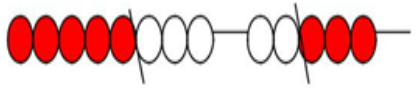
Pictures and symbols

There are 3 sweets in one bag. How many sweets are there in 5 bags?



(Recording on a number line modelled by the teacher when solving problems).

Use of bead strings to model 'groups of'.

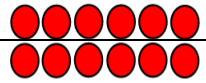


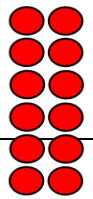
Give children experience of counting equal groups of objects in 2s, 5s and 10s.

Present practical problems solving activities involving counting equal sets or groups (as above).

Arrays

Children to show, draw and recognise arrays to show times tables. E.g. 5 x 2 or 2 x 5



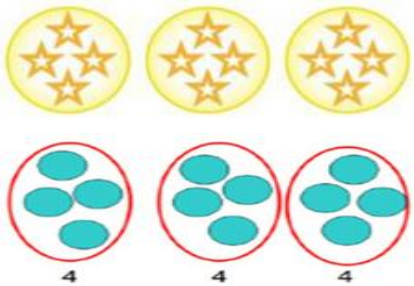


Division

Group and share small quantities.

Pictures / marks

How many groups of 4 can be made with 12 stars? 3



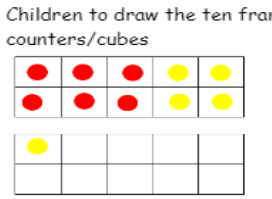
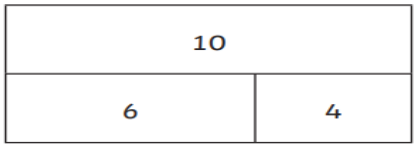
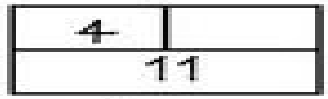
Children to use lots practical apparatus, arrays and picture representations.

Children to begin to count in 2s, 5s and 10s and find half of an amount by sharing equally between 2.

Key vocabulary:

Share, share equally, one each, two each, group, groups of, lots of, array.

Key skills for division at Y1:

Introduce 10 frames for number bonds and addition sums  **Introduce bar model for counting on**  **Key vocabulary:** add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, number line **Key skills for addition at Y1:** • Read and write numbers to 100 in numerals, incl. 1—20 in words • Recall bonds to 10 and 20, and addition facts within 20 • Count to and across 100 • Count in multiples of 1,2,5 and 10 • Solve simple 1 step problems involving addition using objects, number lines and pictorial representations.	**Introduce bar model for finding a missing number and simple subtraction sums.**  **Key vocabulary:** Equal to, take, take away, less, minus, subtract, leaves, difference between, how many more, how many fewer / less than, most, least, count back, how many left, how much less is _____? **Key skills for subtraction at Y1:** • Given a number, say one more or one less. • Count to and over 100, forward and back, from any number. • Represent and use subtraction facts to 20 and within 20. • Subtract with one-digit and two-digit numbers to 20, including zero. • Solve one-step problems that involve addition and subtraction, using concrete objects (e.g. bead strings, objects, cubes) and pictures, and missing number problems. • Read and write numbers from 0 – 20 in numerals and words.	**Key vocabulary:** Groups of, lots of, array, altogether, multiply, count. **Key skills for multiplication at Y1:** • Count in multiples of 2, 5 and 10. • Solve one-step problems involving multiplication, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher. • Make connections between arrays, number patterns and counting in twos, fives and tens. • Begin to understand doubling using concrete objects and pictorial representations.	• Solve one-step problems involving multiplication and division by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher. • Through grouping and sharing small quantities, pupils begin to understand division and finding simple fractions of objects, numbers and quantities. • They make connections between arrays, number patterns and counting in twos, fives and tens.

Year 2

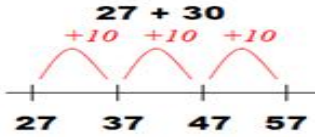
Addition

Add with 2-digit numbers
Developing mental fluency with addition and place value involving 2-digit numbers, then establish more formal methods.

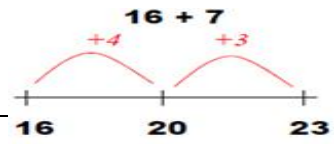
+ = signs and missing numbers
Continue using a range of equations as in Year 1 but with appropriate, larger numbers.
Extend to 14 + 5 = 10 + ☐
and adding three numbers
32 + ☐ + ☐ = 100
35 = 1 + ☐ + 5

Continue use of the bar model from year 1 to show a 'total' when adding 2 numbers together.

Add 2-digit numbers and tens:



Add 2-digit numbers and units:



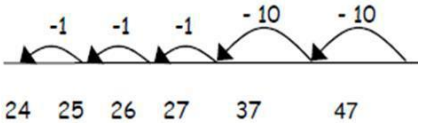
Subtraction

Subtract with 2-digit numbers

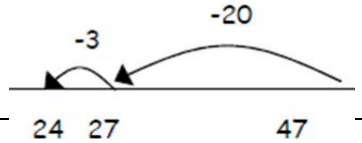
- = signs and missing numbers
Continue using a range of equations as in Year 1 but with appropriate numbers.
Extend to 14 + 5 = 20 - ☐

Subtract on a number line by counting back, aiming to develop mental subtraction skills.
This strategy will be used for:
- 2-digit numbers subtract units (by taking away / counting back) e.g. 36— 7
- 2-digit numbers subtract tens (by taking away / counting back) e.g. 48— 30
- Subtracting pairs of 2-digit numbers (see below:)

47 - 23 = 24 Partition the second number and subtract it in tens and units, as below:



Move towards more efficient jumps back, as below:



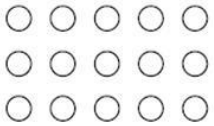
Multiplication

Multiply using arrays and repeated addition (using at least 2s, 5s and 10s)

x = signs and missing numbers

7 x 2 = ☐ ☐ = 2 x 7
7 x ☐ = 14 14 = ☐ x 7
☐ x 2 = 14 14 = 2 x ☐

Arrays and repeated addition
Children should begin to use an array to recognise that multiplication can be shown either way round.



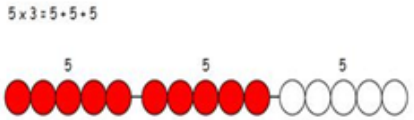
5 x 3 = 15

3 x 5 = 15

Children can also show multiplication as repeated addition.

4 X 5 = 20

Children can also show repeated addition using practical apparatus.



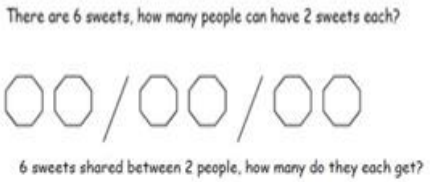
Division

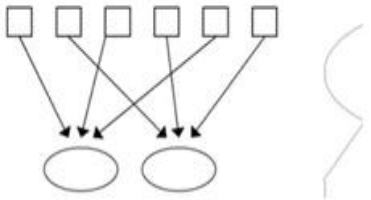
Group and share, using the ÷ and = sign
Use objects, arrays, diagrams and pictorial representations, and grouping on a number line.

÷ = signs and missing numbers

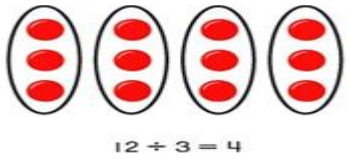
6 ÷ 2 = ☐ ☐ = 6 ÷ 2
6 ÷ ☐ = 3 3 = 6 ÷ ☐
☐ ÷ 2 = 3 3 = ☐ ÷ 2

Understand division as sharing and grouping

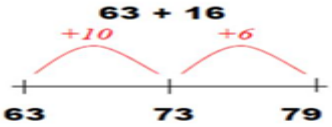




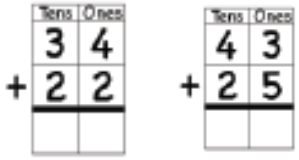
Use arrays to group numbers to recognise division sums.



Add pairs of 2-digit numbers using number line strategy.



When ready (towards the end of year) move onto column method to add simple 2-digit numbers.



Key vocabulary:

add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, number line, sum, tens, ones, partition, addition, column

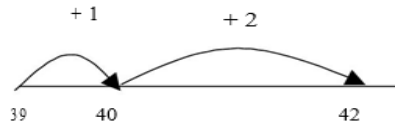
Key skills for addition at Y2:

- Add a 2-digit number and ones (e.g. 27 + 6)
- Add a 2-digit number and tens (e.g. 23 + 40)
- Add pairs of 2-digit numbers (e.g. 35 + 47)
- Add three single-digit numbers (e.g. 5 + 9 + 7)
- Show that adding can be done in any order (the commutative law).

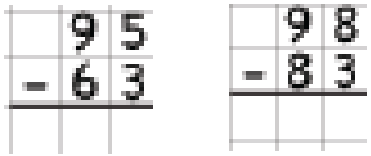
Find a small difference by counting up

Start with the smaller number and count on to the largest.

42 – 39 = 3



When ready (towards the end of the year) move onto column method to subtract simple 2-digit numbers.



Key vocabulary:

Equal to, take, take away, less, minus, subtract, leaves, difference between, how many more, how many fewer / less than, most, least, count back, how many left, how much less is _____? Difference, count on, strategy, partition, tens, ones.

Key skills for subtraction at Y2:

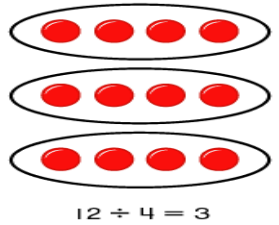
- Recognise the place value of each digit in a two-digit number.

Key vocabulary:

Groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, times as big as, one, twice, three times…..

Key skills for multiplication at Y2:

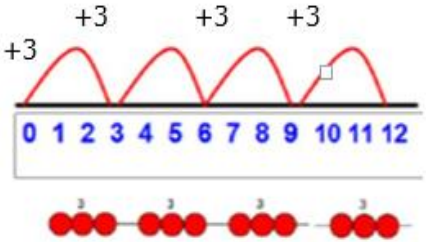
- Count in steps of 2, 3 and 5 from zero, and in 10s from any number.
- Recall and use multiplication facts from the 2, 5 and 10 multiplication tables, including recognising odds and evens.
- Write and calculate number statements using the x and = signs.
- Show that multiplication can be done in any order (commutative).
- Solve a range of problems involving multiplication, using concrete objects, arrays, repeated addition, mental methods, and multiplication facts.
- Pupils use a variety of language to discuss and describe multiplication.



12 ÷ 4 = 3

Using a number line

How many groups of 3 in 12? Children to jump along the number line in groups of the divisor.



12 ÷ 3 = 4

Key vocabulary:

Share, share equally, one each, two each, group, groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over.

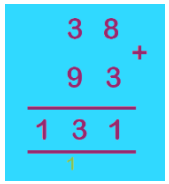
Key skills for division at Y2:

- Count in steps of 2, 3, and 5 from 0
- Recall and use multiplication and division facts for the 2, 5 and 10

• Recall bonds to 20 and bonds of tens to 100 (30 + 70 etc.) • Count in steps of 2, 3 and 5 and count in tens from any number. • Understand the place value of 2-digit numbers (tens and ones) • Solve problems with addition, using concrete objects, pictorial representations, involving numbers, quantities and measures, and applying mental and written methods.	• Recall and use subtraction facts to 20 fluently, and derive and use related facts up to 100. • Subtract using concrete objects, pictorial representations, 100 squares and mentally, including: a two- digit number and ones, a two-digit number and tens, and two two-digit numbers. • Show that subtraction of one number from another cannot be done in any order. • Recognise and use inverse relationship between addition and subtraction, using this to check calculations and missing number problems. • Solve simple addition and subtraction problems including measures, using concrete objects, pictorial representation, and also applying their increasing knowledge of mental and written methods.		multiplication tables, including recognising odd and even numbers. • Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the x, ÷ and = signs. • Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot. • Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.
Year 3			

Addition

Add numbers with up to 3-digits



Children to use column method to add sets of 2-digit numbers together.

Look at carrying when the digit goes over the tens barrier.

Children to move onto adding sets of 3 digit numbers when able.

Continue use of the bar model from Key Stage 1 to show a 'total' when adding 2 numbers together.

315	
185	?

315 – 185 = ?
185 + ? = 315

?	
185	315

185 + 315 = ?
? – 185 = 315

Key vocabulary:
add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, number line, sum, tens, ones, partition, addition, column, carry, missing number.

Key skills for addition at Y3:

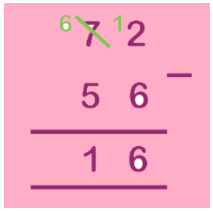
Subtraction

Subtract numbers with up to 3-digits.

Find a small difference by counting up
Continue as in Year 2 but with appropriate numbers (e.g. 102-97=5) Start at the smaller number and count up in tens first and then units to find the rest of the difference.

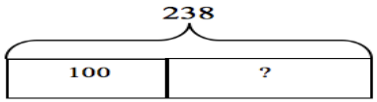
Subtract mentally a 'near multiple of 10' to or from a 2-digit number.
Continue as in Year 2 but with appropriate numbers (e.g. 78 – 49 is the same as 78 – 50 +1)

Column method



Begin to use column method to subtract numbers where no exchanging is required.
Children to subtract 2-digit numbers to begin with and move onto 3-digit when able.
Make sure children understand 'exchanging' from the next column.

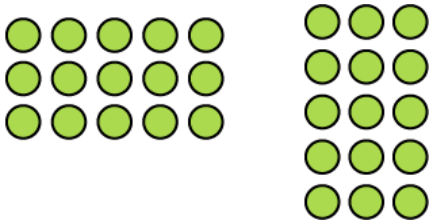
Use a bar model to show a difference between numbers.



Multiplication

Multiply 2-digits by a single digit number.

Arrays and repeated addition
Continue to understand multiplication as repeated addition and continue to use arrays and bead strings. (e.g. 5x3 = 15)



Short multiplication method

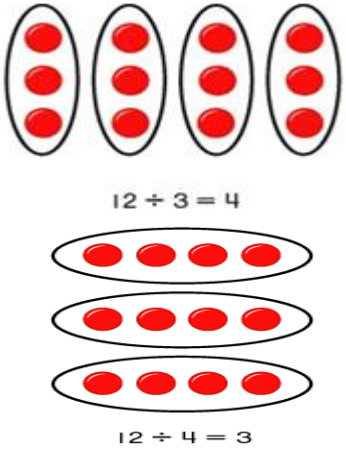
Introduce children to using short multiplication method to multiply 2 and 3-digit numbers by a single digit.

Multiplication facts
Children to recall and work out multiplication facts in the 2,3,4,5,8 and 10 times tables.
Use whole school scheme of 'Times Tables Rockstars to practise at home to increase speed.

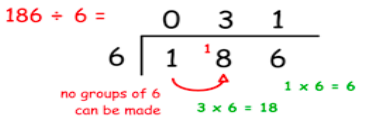
Division

Divide 2 digit numbers by a single digit number with no remainders.

Grouping or sharing

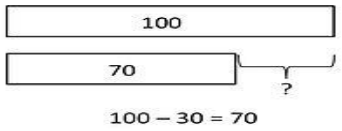


Short division method



Children to begin using short division method ('bus stop') to divide 2 and 3-digit numbers by a single digit number. Begin with no remainders and then move onto numbers which don't divide equally when able.

Key vocabulary:
Share, share equally, one each…two each.., group, equal groups of, lots of, array, divide, divided by, divided

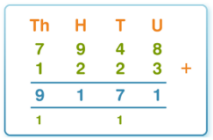
• Read and write numbers to 1000 in numerals and words. • Add 2-digit numbers mentally including those exceeding 100. • Add a 3-digit number and ones mentally (175+8) • Add a 3-digit number and tens mentally (249+50) • Add a 3-digit number and hundreds mentally (381+400) • Estimate answers to calculations, using inverse to check answers. • Solve problems, including missing number problems using number facts, place value and more complex addition. • Recognise place value pf each digit in 3-digit numbers (hundreds, tens, ones). • Continue to practise a wide range of mental addition strategies (e.g. number bonds, additing the nearest multiple of 10, 100 and 1000 and adjusting, using near doubles, partitioning and recombining.	 **Key vocabulary:** Equal to, take, take away, less, minus, subtract, leaves, difference between, how many fewer, how many more, less than, least, count back, how many left, how much less is___?, difference, count on, strategy, partition, exchange, decrease, value, digit, column. **Key skills for subtraction at Y3:** • Subtract mentally a: 3-digit number and ones, 3-digit number and tens, 3-digit number and hundreds. • Estimate answers and use inverse operations to check. • Solve problems, including missing numbers. • Find 10 or 100 more or less than a given number. • Recognise the place value of each digit in a 3-digit number. • Counting up in differences as a mental strategy. • Practise mental subtraction strategies (near multiples of 10 and adjusting).	**Key vocabulary:** Groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, times, __ as big as, once, twice, three times, partition, short multiplication, product, value. **Key skills for multiplication at Y3:** • Recall and use multiplication facts for the 2,3,4,5,8 and 10 times tables and multiply multiples of 10. • Write and calculate number statements using the multiplication tables they know, drawing on mental methods and progressing to reliable written method. • Solve multiplication problems, including missing numbers. • Develop mental strategies using commutativity (e.g. 4 x 12 x 5 = 4 x 5 x 12 etc.) • Solve simple problems in contexts, deciding which operations and methods to use. • Develop efficient mental methods to solve a range of problems including missing numbers.	into, division, grouping, left, left over, inverse, short division, 'carry', remainder. **Key skills for division at Y3:** • Recall and use multiplication and division facts for the 2,3,4,5,8 and 10 times tables. • Write and calculate mathematical statements for multiplication and division using the tables they know. Beginning with mental methods and progressing to formal written methods. • Solve division problems in context (including missing number problems). • Pupils develop efficient mental methods for using multiplication and division facts (e.g. using 3 x 2 = 6 , 6 ÷ 3 = 2 and 2 = 6 ÷ 3) • Pupils develop reliable written methods for division, starting with calculations of 2-digit numbers by 1-digit numbers and progressing to the formal written method of short division.

Year 4

➕ Addition ➕

Add numbers with up to 4 digits.

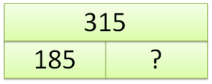
Column method



Build on from previous knowledge of column method to add numbers up to 4-digits.

Reinforce correct place value by reminding them about the actual value (e.g. 4 tens add 2 tens is 60, not just 4 add 2 is 6).

Continue use of the bar model from Key Stage 1 to show a 'total' when adding 2 numbers together.



315 – 185 = ?
185 + ? = 315

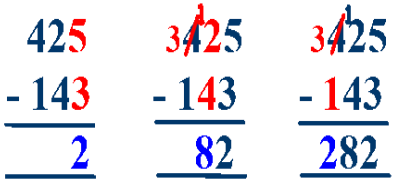
185 + 315 = ?
? – 185 = 315

Key vocabulary:
add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, number line, sum, tens, ones, partition, addition, column, carry, missing number, hundreds, thousands, digits, inverse.

➖ Subtraction ➖

Subtract numbers with up to 4 digits

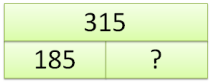
Column method



Build on from previous knowledge of column subtraction to subtract numbers up to 4-digits.

Ensure children understand the concept of 'exchanging' rather than borrowing.

Continue use of the bar model from Key Stage 1 to show a 'difference' when subtracting 2 numbers.



315 – 185 = ?
185 + ? = 315

185 + 315 = ?
? – 185 = 315

Key vocabulary:
equal to, take, take away, less, minus, subtract, leaves, distance between, how many more, how many fewer / less than, most, least, count back , how many left, how

✖ Multiplication ✖

Mutliply 2 and 3 digit numbers by a single digit number

Using commutativity in mental calculations

Build on previous knowledge of arrays to introduce children to the commutative law. Use this in mental calculations.

Short multiplication method

Build on children's previous knowledge of using short multiplication moving up to multiplying 3-digit numbers.

Multiplication facts

Children to recall and work out multiplication facts for all times tables up to 12 x 12.

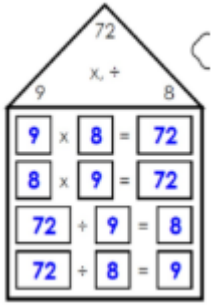
Use whole school scheme of 'Times Tables Rockstars to practise at home to increase speed.

Key vocabulary:

➗ Division ➗

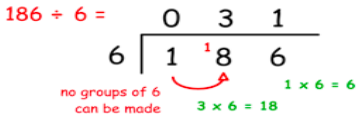
Divide 3 digit numbers by a single digit number.

Recognising links between multiplication and division.



Children to use 'fact families' to understand that division is the 'inverse' of multiplication.

Short division method



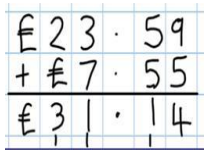
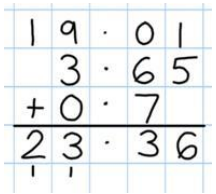
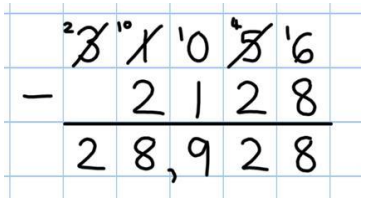
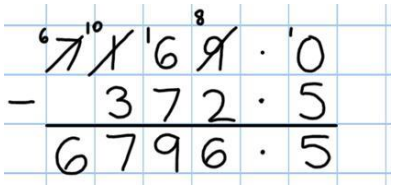
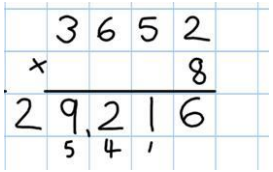
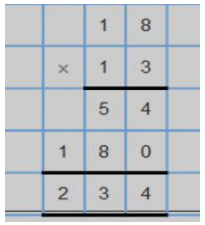
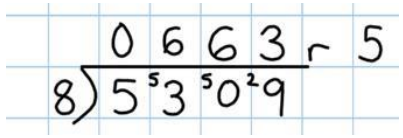
Children to continue to build on knowledge of using short division method ('bus stop') to divide 3-digit numbers by a single digit number.

Begin with no remainders and then move onto numbers which don't divide equally when able.

Key vocabulary

Key skills for addition at Y4: • Select most appropriate method: mental, jottings or written and explain why. • Recognise the place value of each digit in a 4-digit numbers. • Round any number to the nearest 10, 100 or 1000. • Estimate and use inverse operations to check answers. • Solve 2-step problems in context, deciding which operations and methods to use and why. • Find 1000 more or less than a given number. • Continue to practise a wide range of mental addition strategies (e.g. number bonds, add the nearest multiple of 10, 100 and 1000 and adjust, use near doubles, partitioning and recombining. • Add numbers with up to 4-digits using the formal written method of column addition. • Solve 2-step problems in contexts, deciding which operations and methods to use and why. • Estimate and use inverse operations to check answers to a calculation.	much less is_? difference, count on, strategy, partition, tens, units exchange, decrease, hundreds, value, digit, inverse **Key skills for subtraction at Y4:** • Subtract by counting on where numbers are close together or they are near to multiples of 10, 100 etc. • Children select the most appropriate and efficient methods for given subtraction calculations. • Estimate and use inverse operations to check answers. • Solve addition and subtraction 2-step problems, choosing which operations and methods to use and why. • Find 1000 more or less than a given number. • Count backwards through zero, including negative numbers. • Solve number and practical problems that involve the above, with increasingly large numbers.	groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, array, column, row, commutative, groups of, sets of, lots of, equal groups, times, multiply, times as big as, once, twice, three times… partition, grid method, total, multiple, product, sets of. **Key skills for multiplication at Y4:** • Count in multiples of 6,7,9,25 and 1000. • Recall multiplication facts up to 12 x 12. • Recognise place value of digits in up to 4-digit numbers. • Use place value, known facts and derived facts to multiply mentally. (e.g. multiply by 1, 10, 100, by 0). • Use commutativity and other strategies mentally 3 x 6 = 6 x 3, 2 x 6 x 5 = 10 x 6, 39 x 7 = 30 x 7 + 9 x 7. • Solve problems with increasingly complex multiplication.	share, share equally, one each, two each…, group, equal groups of, lots of, array, divide, divided by, divided into, division, grouping, number, line, left, left over, inverse, short division, carry', remainder, multiple, divisible by, factor **Key skills for division at Y4:** • Recall multiplication and division facts for all numbers up to 12 x 12. • Use place value, known and derived facts to multiply and divide mentally. • Pupil's practise to become fluent in the formal written method of short division with exact answers when dividing by a 1-digit number. • Pupils practise mental methods and extend this to 3-digit numbers to derive facts (e.g. 200 x 3 = 600 so 600 ÷3 = 200). • Pupils solve 2 step problems in contexts, choosing an appropriate operation, working with increasingly harder numbers.

Year 5

➕ Addition ➕	➖ Subtraction ➖	✖ Multiplication ✖	➗ Division ➗
Add sets of numbers with more than 4-digits. **Column addition** 4078 + 7806 _____ Children to build on knowledge of column addition from LKS2, adding numbers up to 4 digits with digits that 'carry'.  Move onto using the method in problems with money and decimals. Ensure children understand that the decimal point should be aligned and must be included in the answer too.  Pupils should be able to add more than two values, carefully aligning place value columns before adding. Use their knowledge of tenths and hundredths to help lining up digits. **Key vocabulary:** add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, number line, sum, tens, units, partition, plus,	**Subtract numbers with at least 4 digits.** **Column subtraction**  Children to build on knowledge of column subtraction from LKS2. Ensure children fully understand the concept of 'exchanging'.  Subtract with decimal values, including mixtures of integers and decimals. Ensure children understand the importance of place value and lining up the decimal point. **Key vocabulary:** equal to, take, take away, less, minus, subtract, leaves, distance between, how many more, how many fewer / less than, most, least, count back, how many left, how much less is_? difference, count on,	**Multiply numbers with up to 4-digits by a one or two digit number** **Short multiplication method**  Children to continue to use short multiplication method, moving up to multiplying 4 digit numbers by a single digit. **Long multiplication method**  Introduce children to the method of long multiplication. Children should see it as building from short multiplication (1st layer) and understand the importance of the place holder in the ones column for the second layer. **Mutliplication facts**  Increase children's speed and accuracy of using times table facts. Use of Times table Rockstars. **Key vocabulary:**	**Divide numbers with up to 4-digits by a single digit including those with remainders.** **Short division** Develop knowledge of short division method from LKS2 and begin to work on answers that include remainders.  Short division with remainders: Now that pupils are introduced to examples that give rise to remainder answers, division needs to have a real life problem solving context, where pupils consider the meaning of the remainder and how to express it, ie. as a fraction, a decimal, or as a rounded number or value , depending upon the context of the problem. **Key vocabulary:** share, share equally, one each, two each…, group, equal groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, 'carry', remainder, multiple, divisible by, factor, inverse, quotient, prime number, prime factors, composite

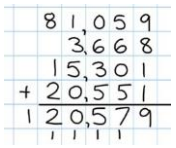
addition, column, tens boundary, hundreds boundary, increase, 'carry', expanded, compact, vertical, thousands, hundreds, digits, inverse & decimal places, decimal point, tenths, hundredths, thousandths **Key skills for addition at Y5:** • Add numbers mentally with increasingly large numbers, using and practising a range of mental strategies. (e.g. add the nearest multiple of 10, 100 or 1000 and adjust, use near doubles, inverse, partitioning and recombining, using number bonds.) • Use rounding to check answers and accuracy. • Solve multi step problems in contexts. • Read, write, order and compare numbers to at least 1 million and determine the value of each digit, • Round any number up to 1,000,000 to the nearest 10, 100, 1000, 10000 and 100000. • Add numbers with more than 4-digits using column addition.	strategy, partition, tens, units ,exchange, decrease, hundreds, value, digit, inverse, tenths, hundredths, decimal point, decimal **Key skills for subtraction at Y5:** • Subtract numbers mentally with increasingly larger numbers. • Use rounding and estimation to check answers to calculations and determine, in a range of contexts, levels of accuracy. • Solve addition and subtraction multi-step problems in context, deciding which operations and methods to use and why. • Read, write, order and compare numbers to at least 1 million and determine the value of each digit. • Count forwards and backwards in steps of powers or 10 for any given number up to 1 million. • Interpret negative numbers in context, counting forwards and backwards with positive and negative integers through 0. • Round any number up to 1 million to the nearest 10, 100, 1000, 10000 and 100000.	groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, times, as big as, once, twice, three times..., partition, grid method, total, multiple, product, inverse, square, factor, integer, decimal, short/long multiplication, carry **Key skills for multiplication at Y5:** • Indentify mutliples and factors, using knowledge of times tables up to 12 x 12. • Solve problems where larger numbers are decomposed into their factors. • Multiply and divide integers and decimals by 10, 100 and 1000. • Recognise and use square and cube numbers and their notation. • Solve problems involving a combination or operations, choosing and using calculations and methods appropriately.	**Key skills for division at Y5:** • Multiply and divide numbers mentally, drawing on known facts. • Identify multiples and factors, including finding all factor pairs of a number and common factors of two numbers. • Solve problems involving multiplication and division, where larger numbers are decomposed into their factors. • Multiply and divide whole numbers and decimals by 10, 100 and 1000. • Use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers. • Work out if a number is prime and recall all prime numbers to 19. • Divide numbers up to 4-digits by a one-digit number using short division. • To use multiplication and division as inverses. • Solve problems involving combinations of all four operations.

Year 6

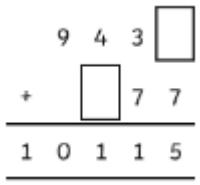
➕ Addition ➕

Solve addition and subtraction multi-step problems, deciding which method to use

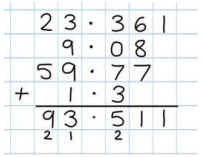
Column addition



Continue to use column addition to find answers to problems. Building on adding sets of numbers with more than 4 digits.



Build on place value knowledge to find missing numbers in calculations.



Continue to develop understanding of decimal numbers and money. Focus on the use of 0 as a place holder.

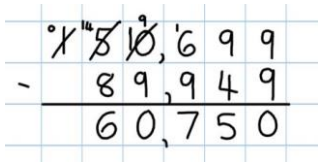
Key vocabulary:

add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, number line, sum, tens, units, partition, plus, addition, column, tens boundary, hundreds boundary, increase, 'carry', expanded, compact, vertical, thousands, hundreds, digits, inverse, decimal

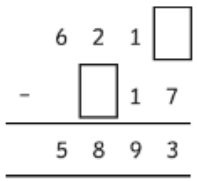
➖ Subtraction ➖

Solve addition and subtraction multi-step problems, deciding which method to use

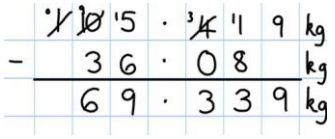
Column subtraction



Continue to use column subtraction to subtract increasingly larger numbers.



Build on place value knowledge to find missing numbers in calculations. Ensure children use exchanging to work from the ones column.



Continue to develop understanding of decimal numbers and money. Focus on the use of 0 as a place holder.

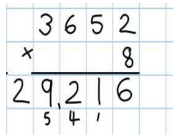
Key vocabulary:

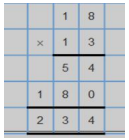
equal to, take, take away, less, minus, subtract, leaves, distance between, how many more, how many fewer / less than, most, least,

✖ Multiplication ✖

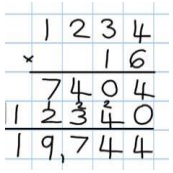
To multiply numbers with at least 4-digits by 2 and 1 digit.

Short and long multiplication



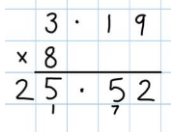


Children to build on knowledge from Year 5 with short and long multiplication.



Move onto multiplying 3 and 4 digit numbers by a 2 digit number using the long multiplication method.

Multiplying decimals with up to 2 decimal places by a whole number.



Use familiar method to multiply decimals. Remind children that single digit belongs to the ones column. Line up digits carefully and remember decimal point.

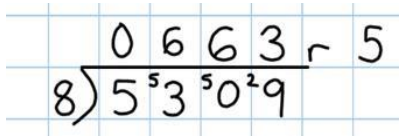
Mutliplication facts

Increase children's speed and accuracy of using times table facts. Use of Times table Rockstars.

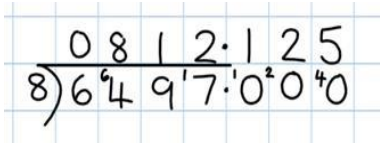
➗ Division ➗

Divide numbers with at least 4-digits by a single or 2-digit number.

Short division

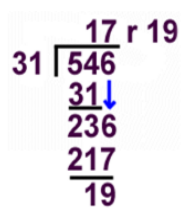


Continue to use short division method to find answers with remainders.

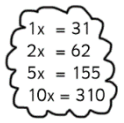


Children should develop the method to look at converting a remainder to a decimal number. (e.g. instead of writing remainder 1, a decimal point is added after the units and the remainder is continued to be carried).

Long division



Introduce children to long division method in which they must work along the number to find groups of 31 to 'go into' it.



Children are encouraged to draw a 'fact bubble' to help with their working out. Using these

places, decimal point, tenths, hundredths, thousandths **Key skills for addition at Y6:** • Perform mental calculations, including with mixed operations and large numbers using and practising a range of mental strategies. • Solve multi-step problems in context, deciding which operations and methods to use and why. • Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy. • Read, write, order and compare numbers up to 10 million and determine the value of each digit. • Round any whole number to a required degree of accuracy. • Pupils understand how to add mentally with larger numbers and calculations of increasing complexity.	count back, how many left, how much less is_? difference, count on, strategy, partition, tens, units exchange, decrease, hundreds, value, digit, inverse, tenths, hundredths, decimal point, decimal **Key skills for subtraction at Y6:** • Solve addition and subtraction multi-step problems in context, deciding which operations and methods to use and why. • Read, write, order and compare numbers up to 10 million and determine the value of each digit. • Round any whole number to a required degree of accuracy. • Use negative numbers in context, and calculate intervals across zero. • Children need to utilise and consider a range of mental subtraction strategies, jottings and written methods before choosing how to calculate.	**Key vocabulary:** groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, array, column, row, commutative, sets of, equal groups, times as big as, once, twice, three times...partition, grid method, total, multiple, product, inverse, square, factor, integer, decimal, short / long multiplication, 'carry', tenths, hundredths, decimal **Key skills for multiplication at Y6:** • Recall multiplication facts for tables up to 12 x 12. • Multiply multi-digit numbers up to 4-digit x 2-digit using long multiplication. • Perform mental calculations with mixed operations and large numbers. • Solve multi-step problems in a range of contexts, choosing appropriate combinations of operations and methods.	simple facts, they can work out other 'groups' (e.g. 3x31 = 62+31). **Key vocabulary:** share, share equally, one each, two each..., group, equal groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, 'carry', remainder, multiple, divisible by, factor, inverse, quotient, prime number, prime factors, composite **Key skills for division at Y6:** • Divide numbers up to 4 digits by a 2 digit whole number using the formal written method of long division. • Interpret remainders as whole numbers, fractions, decimals or by rounding. • Use short division where appropriate. • Perform mental calculations including with mixed operations and large numbers. • Use written division methods in cases where the answer has up to 2 decimal places.