St THOMAS
CE (VC) PRIMARY SCHOOL

Maths Calculation Policy

Policy reviewed on:	April 2020
Policy approved by Governing Body on:	
Policy to be reviewed on:	April 2022

Progression Towards a Standard Written Method of Calculation

Introduction

This calculation policy has been written in line with the programmes of study taken from the revised National Curriculum for Mathematics (2014). It provides guidance on appropriate calculation methods and progression. The content is set out in year group blocks (guidance only) under the following headings: addition, subtraction, multiplication and division.

Aims of the Policy:
- To ensure consistency and progression in our approach to calculation.
- To ensure that children develop an efficient, reliable, formal written method of calculation for all operations.
- To ensure that children can use these methods accurately with confidence and understanding.

How to Use This Policy:
- Use the policy as the basis of your planning but ensure you use previous or following stages' guidance to allow for personalised learning.
- Always use Assessment for Learning to identify suitable next steps in calculation for groups of children.
- If, at any time, children are making significant errors, return to the previous stage in calculation.
- Always use suitable resources, models and images to support children's understanding of calculation and place value, as appropriate.
- Encourage children to make sensible choices about the methods they use when solving problems.
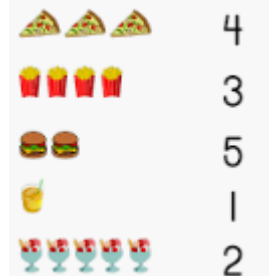
Representations:
The key to successful implementation of a school calculation policy is the consistent use of representations (models and images that support conceptual understanding of the mathematics) and this policy promotes a range of relevant representations across the primary years.
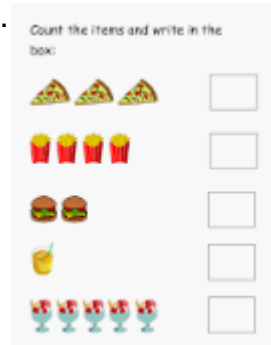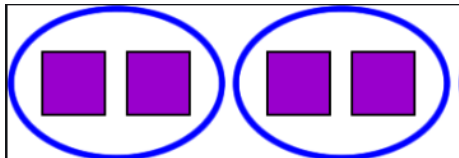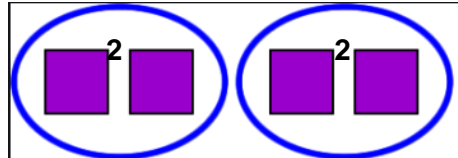
Mathematical understanding is developed through use of representations that are first of all <u>concrete</u> (e.g. Dienes apparatus, cubes), and then <u>pictorial</u> (e.g. array, place value counters) to then facilitate <u>abstract</u> working (e.g. column addition, long multiplication).

This policy guides teachers through an appropriate progression of representations, and if at any point a pupil is struggling they should revert to familiar pictorial and/or concrete materials/ representations as appropriate.

Whilst a mathematically fluent child will be able to choose the most appropriate representation and procedure to carry out a calculation, whether written or mental, teachers should support pupils with carefully selected representations that underpin calculation methods (as detailed in this policy), and ensure there is consistency across year groups.

ADDITION

YEAR	OBJECTIVE	CONCRETE	PICTORIAL	ABSTRACT
EYFS **Nursery**	**PRE ELG** **30-50 months.** Recites numbers in order to 10.	Singing nursery rhymes and counting songs.	Putting numbers in order on a picture.	Verbal counting to 5 then 10. Writing numbers in order.
	Knows that numbers identify how many objects are in a set.	Counting out objects.	Looking at pictures of objects and matching with a number.	Count objects or pictures and write the number. Know that the last number counted is how many there are.
	Separates a group of three or four objects in different ways, beginning to recognise that the total is still the same.	Sorting 3 or 4 objects into sets.	Sort 3 or 4 cubes into 2 sets. Do it in different ways.	Write different ways of making 3 or 4.

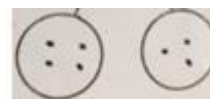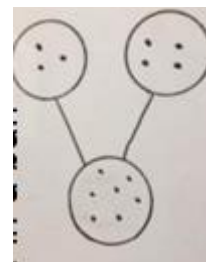| Reception	ELG			
	Add two single digit numbers to 20. Count on to find the answer.	Use cubes or any other resources (numicon, sorting objects) to add two numbers together as a group or on a 5/10 frame. **4 + 3 =** **1 + 6 =** 	Use pictures to add two numbers together as a group. Model to children first. Talk through number sentence together. **4 + 3 =** Use a part/whole model to add two numbers together. **3 + 4 =** 	Use a number line to add two numbers together. Put your finger or pen on 6 and count on 3. What number do you finish at? **6 + 3 = 9**

| **YEAR 1** | Read, write and interpret mathematical statements involving + sign. Add 1 digit and 2 digit numbers to 20 including 0.

. | Use cubes or any other resources (numicon, sorting objects) to add two single digit numbers together, then moving onto 2 digit numbers as a group or on a 5/10 frame.

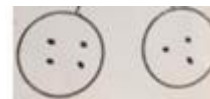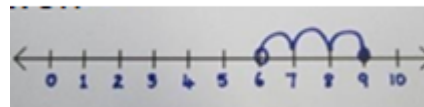**4 + 3 =**
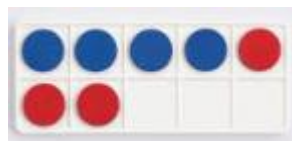
Start at the bigger number and count on. | Use spots/dots to work out sum. Use a number line to count on in ones.

4 + 3 =

6 + 3 = 9

 | The abstract number line: Imagine in own head – just know answer. Draw own number line.

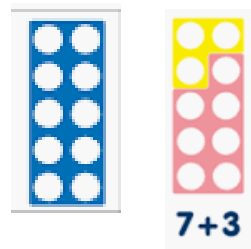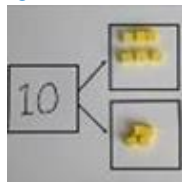**5 + 3 = 8**

5 + 12 = 17

Place the larger number in your head and count on with the smaller number to find your answer. |

| **YEAR 1**	Represent and use number bonds within 20.	Regrouping to make 10 using counters/cubes or numicon and ten frames. **6 + 4 = 10** **7+3**	Children to use the part/whole model and spots/dots. Write in different ways. **10 = 4 + 3** **3 + 4 = 10** Regroup and partition10 in different ways.	See the pattern. Write logically. **1 + 9 =10** **2 + 8 =10** **3 + 7 =10 etc**
	Solve 1 step problems that involve addition.	Children to use objects to work out problems. **If I am at seven, how many more do I need to make 10?** 	Children to use pictures to work out problems. **If I am at seven, how many more do I need to make 10?** | | | | | | | | | |	Draw or use a number line to work out. What is 2 more than 4? What is the sum of 4 and 4? What's the total of 4 and 2? Children to develop an understanding of equality and missing numbers: **6 + = 11** **6 + 5 = 5 +** **6 + 5 = + 4**

| YEAR 2 | Add 2 digit numbers and ones, 2 digit numbers and tens, two 2 digit numbers. | Begin with using a numberline.

15 + 4 =
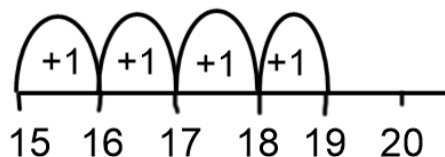
Move onto adding 10's then 1's. Partition 16 in 10 + 6. Begin counting in1's rather than the units number as a whole, then move onto adding 6 as a whole.
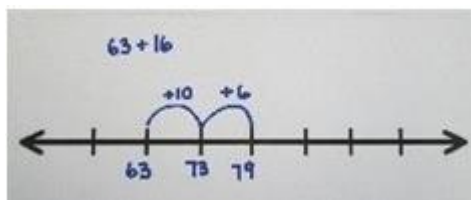
Then move onto column addition without crossing 10's using Base 10/Dienes.

17 + 12 =
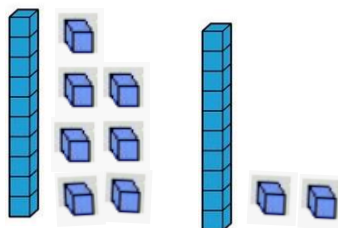
 | Begin with using a numberline. Children to draw number lines in books.

Column addition by drawing Base 10/Dienes in books.

17 + 12 =

 | Abstract number lines. Keep one number in head and use fingers to count on.

Column method written in books.

  T O
  1 7
+ 1 2
  2 9 |

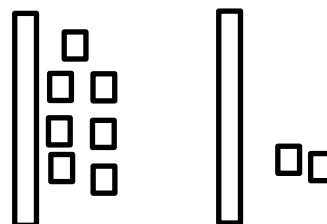|		Continue with column addition and move onto exchanging. Make both numbers on a place value grid. Continue to develop understanding of partitioning and place value.	Exchanging using pictures of Base 10/Dienes. Use T O frames.	Column method written in books showing exchanging.
		$36 + 25 =$		T O 2 3 + 3 8 6 1 1
		Add up the ones and exchange 10 ones for 1 ten.		
Adding 3 single digit numbers.		Use bead strings to put 4 and 6 together to make 10. Add on 7. $4 + 7 + 6 = 17$ 	Add together three groups of objects. Draw a picture to recombine the groups to make 10. $3 + 5 + 7 =$ 	Combine the two numbers that make 10 and then add on the remainder. $4 + 7 + 6 = 10 + 7$ 10 $= 17$

| YEAR 3 | Add numbers with up to 3 digits using column addition. | Column method – no regrouping. TO + TO
Add together the ones first, then add the tens. Use the Base 10 blocks first before moving onto place value counters.
Continue to develop understanding of partitioning and place value and use this to support addition.
Begin with no exchanging

63 + 16
 | This could be done a number of ways:

27 + 30

+10 +10 +10
27 37 47 57

63 + 16

+10 +6
63 73 79 | 23 + 34
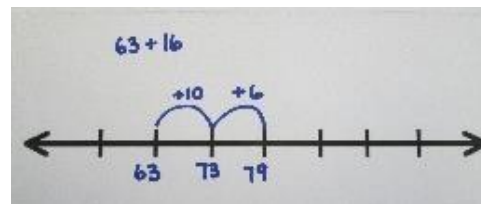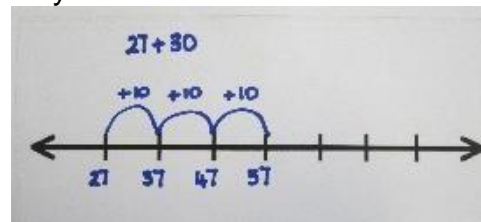
20 + 3
+ 30 + 4
50 + 7
= 57 |

| **YEAR 3/4** | Add numbers with up to 4 digits using the formular written methods of Columnar addition where appropriate

TO + TO | With exchanging:

24 + 15 =
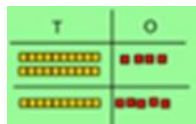
44 + 15 =

Continue to develop understanding of partitioning and place value and use this to support addition. Begin with no exchanging.
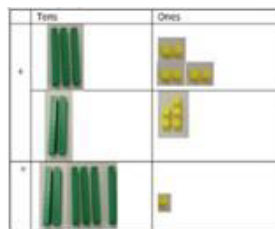
36 + 25 = | **25 +36 =**
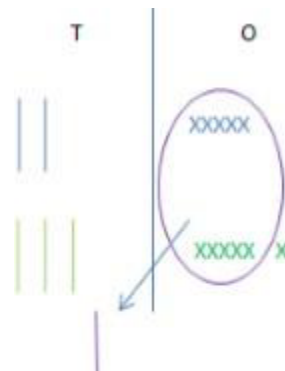
36 + 25= | **36 + 25 =**

30 + 20 = 50

6 + 5 = 11

36
+25
61
1 |

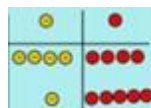| YEAR 4/5/6 | Add whole numbers with more than 4 digits using column method with regrouping not mentioned.

HTO + HTO | Make both numbers on a place value grid.
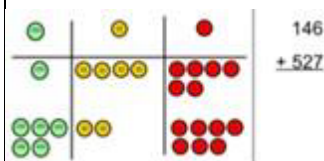
Add up the units and exchange 10 ones for 1 ten.
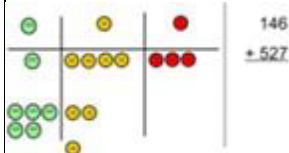
Add up the rest of the columns, exchanging the 10 counters from one column for the next place value column until every column has been added.

This can also be done with Base 10 to help children clearly see that 10 ones equal 1 ten and 10 tens equal 100.

As children move on to decimals, money and decimal place value counters can be used to support learning. | Children can draw a pictorial representation of the columns and place value counters to further support their learning and understanding.
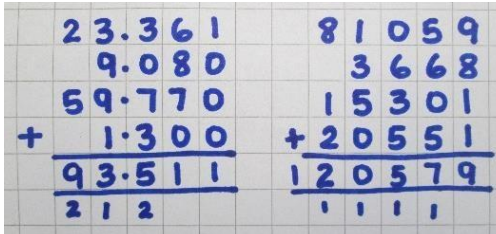
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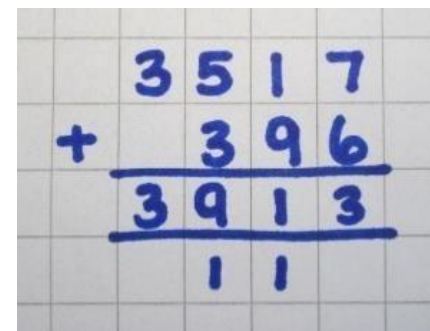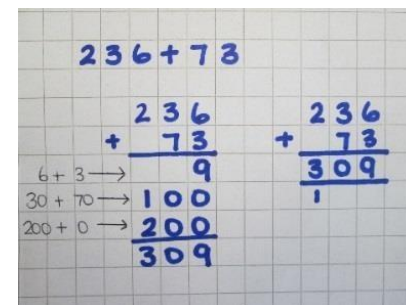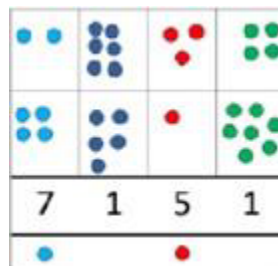
As the children move on, introduce decimals with the same number of decimal places and different. Money can be used here.

 |
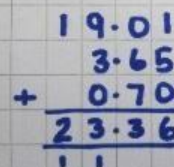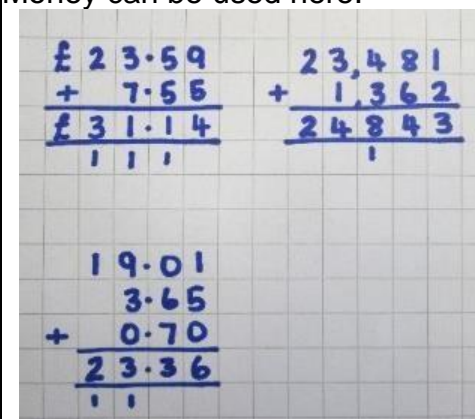
YEAR 5/6	Perform mental calculations, incl with mixed operations & large numbers.	-	-	Add 'zeros' where needed to show the place value of decimals.

```
  2 3 . 3 6 1        8 1 0 5 9
     9 . 0 8 0           3 6 6 8
  5 9 . 7 7 0        1 5 3 0 1
+    1 . 3 0 0      + 2 0 5 5 1
  _____        _____
  9 3 . 5 1 1      1 2 0 5 7 9
   2   1  2          1  1  1  1
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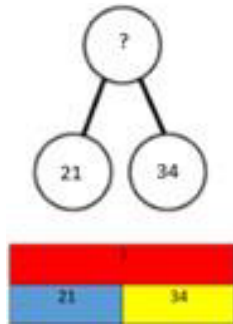
Sam saved £21 one week and £34 another.
How much did he save in total?

21+34=55. Prove it! (Reasoning but the children need to be fluent in representing this)

21
+34
___

21 + 34 =

[ ] = 21 + 34
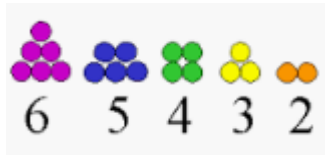
What's the sum of twenty one and thirty four?

+
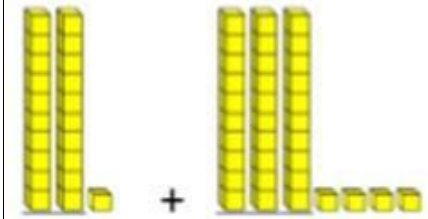
Always use missing digit problems too:

Tens	Ones
⊙ ⊙	●
⊙ ⊙ ⊙	?
?	4

SUBTRACTION

YEAR	OBJECTIVE	CONCRETE	PICTORIAL	ABSTRACT
EYFS **Nursery**	**PRE ELG** **30-50 months.** Recites numbers in order to 10.	Counting songs and nursery rhymes.	Counting and ordering numbers backwards. Matching the number.	Writing numbers backwards in order.
	Knows that numbers identify how many objects are in a set.	Counting out objects and taking 1 away. Count how many are left.	Drawing pictures and counting back one up to 5.	Using fingers to show taking away 1. **3 - 1 =**

EYFS Reception	ELG Subtract two single digit numbers. Count back to find the answer.	Physically taking away and removing objects from a whole. Numicon, cubes, tens frames and other items could be used.	Children to draw the concrete resources they are using and cross out the correct amount. Use tens frames also to show subtraction.	Use a number line to work out the sum.

Physically taking away and removing objects from a whole. Numicon, cubes, tens frames and other items could be used.

6 – 1

Use numicon to show how many are left.

8 – 5 =

Children to draw the concrete resources they are using and cross out the correct amount. Use tens frames also to show subtraction.

4 – 3 =

3 take away 2 is 1
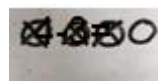
Children to move onto drawing spots/dots to cross out to find answer.

4 - 1 =   8 - 1 =
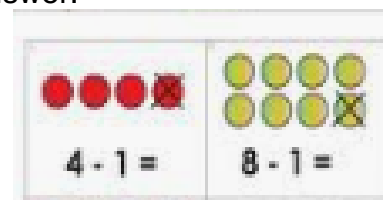
Use a number line to work out the sum.

7 – 4 = 3

7-4=3

| YEAR 1 | Subtract 1 digit and 2 digit numbers to 20 including 0. | Begin by using concrete apparatus such as numicon, cubes and other objects.
Physically take away and remove objects from a whole as in reception.

6-1

8 – 5 = 3

3 | Use spots/dots to cross out. Children can draw their own in books.

10 - 2 =

Start at the bigger number and count back in ones showing the jumps on the number line.

Start at 9. Take away 3 to reach 6.

9 – 3 = 6

0 1 2 3 4 5 6 7 8 9 10
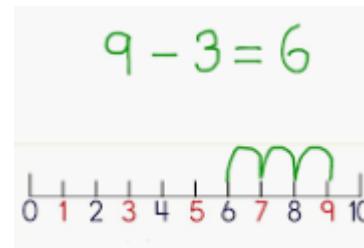
This can progress all the way to counting back using two 2 digit numbers. | Children can use number lines, abacos or hundred squares, number bonds, counting back in tens knowledge to work out sums.

Progress onto missing numbers and problem solving. |

| YEAR 1 | | Using tens frames
14 − 9 =

Make 14 on the ten frame. Take away the four first to make 10 and then takeaway one more so you have taken away 5.

Step 1   **Step 2**   **Step 3** | Work out a sum using pictures of tens frames.

14 − 5 = | Children can visualize tens frames or use fingers to work out sums. |

YEAR 2	Recall and use number bonds and related subtraction facts within 20. Subtract 2 digit numbers and ones, 2 digit numbers and tens, two 2 digit numbers	Begin with subtraction on a number line first with subtracting a single digit number. $16 - 3 = 13$ Then subtract a 2 digit number on a number line. Subtract the 10's first and then the 1's. **47 – 23 =** 	Children to draw number lines into their own books and work out as previously.	Children to use knowledge of partitioning and counting back in 10's and 1's to calculate sum. 47 – 23 = 47 -20 – 3 =
YEAR 2		Begin column method without regrouping (Incorporating Base 10) Use Base 10 to make the bigger number then take the smaller number away. 47 – 4 = 	Draw the Base 10 or place value counters alongside the written calculation to help to show working. Children to represent pictorially. **48 - 7 = ?** 	Column method as shown. This should lead to clear written column subtraction. TO 97 - 56 41 TO 89 - 21 68
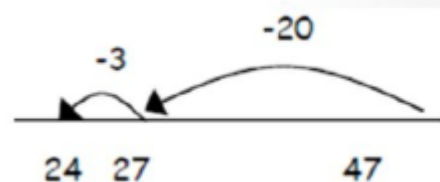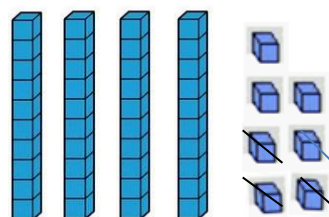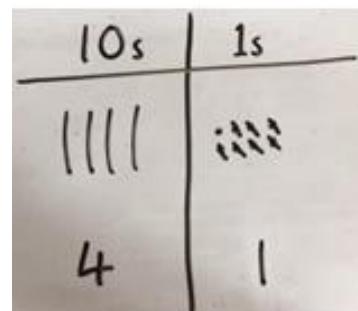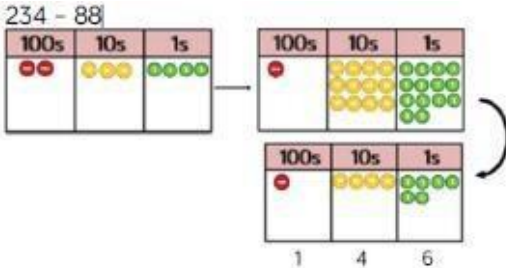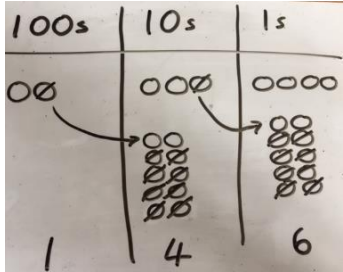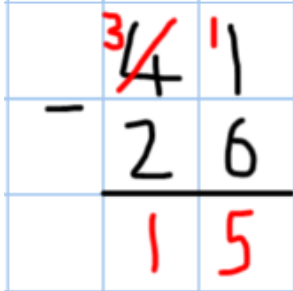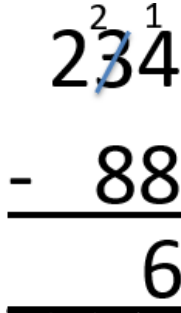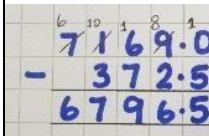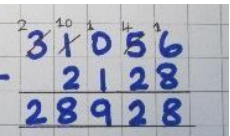
| YEAR 3/4/5 | **Y3** Subtract numbers with up to 3 digits using formal written methods of column subtraction.

Y4 Subtract numbers with up to 4 digits using formal written methods of column subtraction | Column method with regrouping (Incorporate base 10)
Column method using base 10 and having to exchange.
Using place value counters.

234 – 88 =

Make the larger number with the place value counters
Start with the ones, can I take away 8 from 4 easily? I need to exchange one of my tens for ten ones. | Represent the Base 10 pictorially, remembering to show the exchange.

Draw the counters onto a place value grid and show what you have taken away by crossing the counters out as well as clearly showing the exchanges you make.

When confident, children can find their own way to record the exchange/regrouping. | Children must understand that when they have exchanged the 10 they still have 41 because 41 = 30 + 11.

Children must understand what has happened when they have crossed out digits.
 |
| YEAR 5/6 | **Y5** Subtract whole numbers with more than 4 digits including using formal written methods of column subtraction. | - | - | |

	Y6 Solve subtraction multi-step problems in contexts deciding which operations and methods to use and why. Perform mental calculations incl with mixed operations & large numbers.		
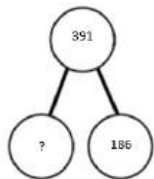
391 ? 186 391 186 | ?	Raj spent £391, Timmy spent £186. How much more did Raj spend? Calculate the difference between 391 and 186.	☐ = 391 – 186 391 -186 ____ What is 186 less than 391?	Missing number calculations 3 9 ☐ - ☐☐ 6 ____ ☐ 0 5
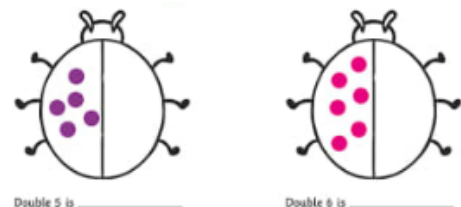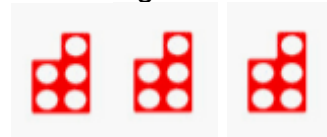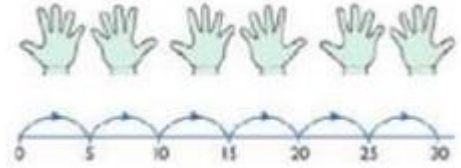
MULTIPLICATION

YEAR	OBJECTIVE	CONCRETE	PICTORIAL	ABSTRACT
EYFS	ELG Solve problems including doubling.	Use practical activities to show how to double a number.	Draw pictures to show how to double a number. Double 5 is _____ Double 6 is _____	Children to have learned double facts and be able to recite them and write them down. 1+ 1 = 2 2+ 2 = 4 Problem solving activities applying knowledge. If I have 2 cars and my friend gives me 2 more – how many do I have now? Recite counting in 2's to 20.
YEAR 1	Solve one-step problems involving multiplication calculating the answer using concrete objects, pictorial representation and arrays with the support of the teacher.	Counting in multiples of 2's, 10's and 5's. Count in multiples supported by concrete objects in equal parts. Use cubes, numicon and bead strings.	Use a number line or pictures to continue support in counting in multiples.	Count in multiples of a number aloud. (Use a counting rod to support this). **Write sequences with multiples of numbers.** **2, 4, 6, 8, 10** **5, 10, 15, 20, 25 , 30**

YEAR 1	Repeated addition	Repeated grouping/repeated addition.	Children to represent in a picture.	Write addition sentences to describe objects and pictures.
		3 × 5 **5 + 5 + 5** **There are 3 equal groups, with 5 in each group.** 	There are 3 plates. Each plate has 2 star biscuits on. How many biscuits are there? 2 add 2 add 2 equals 6 **2 + 2 + 2 =**	**5 + 5 + 5 = 15**
		Move onto arrays. Use cubes, counters to make arrays. 2 lots of 5 **NB how we write the array**	Draw arrays in books. O O O O **3 lots of 2** O O	Use number patterns learned to work out sums. 5, 10, 15, 20, 25
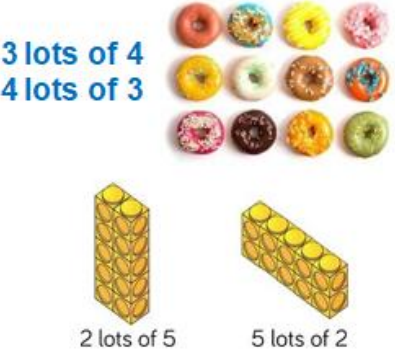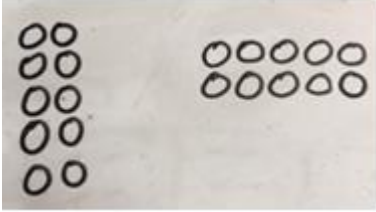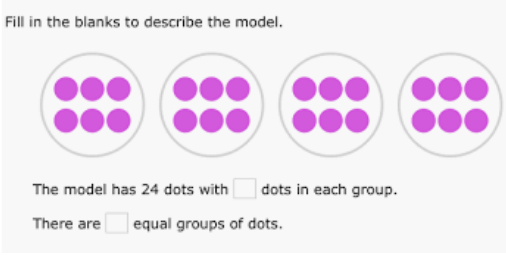
YEAR 2	Solve problems involving multiplication using materials, arrays, repeated addition and multiplication facts.	Create arrays using counters, cubes, numicon and other objects to show multiplication sentences. **3 x 4 =** 3 lots of 4 4 lots of 3 2 lots of 5 5 lots of 2	Children to represent the arrays pictorially. Write a number sentence to go with them. **2 x 5 5 x 2** Make sure the arrays are drawn in different orientations to find the commutativity. (Link arrays to areas of rectangles)	Children to be able to use an array to write a range of calculations e.g. **10 = 2 × 5** **5 × 2 = 10** **2 + 2 + 2 + 2 + 2 = 10** **10 = 5 + 5** Use an array to write multiplication sentences and reinforce repeated addition.
YEAR 2		Count, make and find equal groups of objects. There are – equal groups with – in each group.	Children to draw their own equal groups and write the number sentence. Fill in the blanks to describe the model. The model has 24 dots with ⬜ dots in each group. There are ⬜ equal groups of dots.	Children to use multiplication facts to work out sums and problems. Show their working out. **There are 24 dots** **6 + 6 + 6 + 6** **There are 4 equal groups of 6.**

| **YEAR 3** | Grid method

Write and calculate mathematical statements for multiplication using the multiplication tables that they know including 2 digit x 1 digit, using mental and progressing to formal written methods. | Show the link with arrays to first introduce the grid method.
4 rows of 10
4 rows of 3
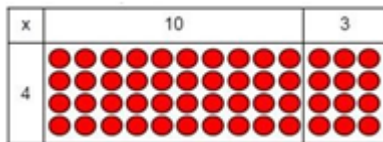
Move on to using Base 10 to move towards a more compact method
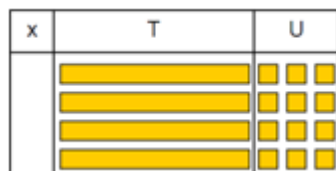
Move on to place value counters to show how we are finding roups of a number. We are multiplying by 4 so we need 4 rows.

Fill each row with 126.
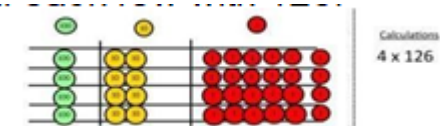
Add up each column starting with the ones making any exchanges needed.
Then you have your answer.
 | Children can represent the work they have done with place value counters in a way that they understand.
They can draw the counters, using colours to show different amounts or just use circles in the different columns to show their thinking.
 | Children to be encouraged to show the steps they have taken.
4 x 15
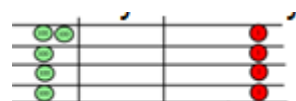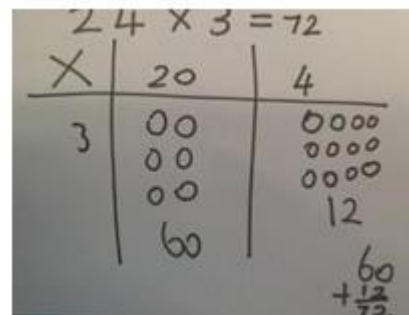
10   5

10 x 4 = 40
5 x 4 = 20
40 + 20 = 60

A number line can also be used.
 |
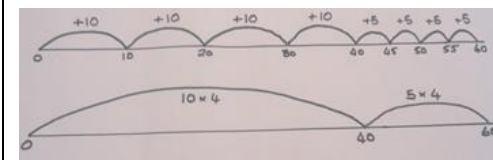
YEAR 3/4	Partition to multiply Yr 3 objective Write and calculate mathematical statements for multiplication using the multiplication tables that they know including 2 digit x 1 digit progressing to formal written methods.	You can use Numicon, base 10 or Cuisenaire rods. **3 × 15 =** 	Children to represent the concrete manipulatives pictorially. 15 x 4 = 	Start with multiplying by one digit numbers and showing the clear addition alongside the grid. | **×**	**30**	**5**
7	**210**	**35** | 210 + 35 = 245
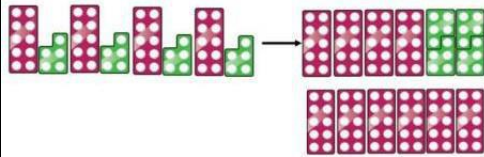
| YEAR 4/5 | Column multiplication

Year 4 Objective Multiply 2 digit and 3 digit numbers by a 1 digit number using formal written layout

Yr 5 obj Multiply numbers up to 4 digits by a 1 digit or 2 digit number using a formal written method, including long multiplication for 2 digit numbers. | Children can continue to be supported by place value counters at the stage of multiplication.
It is important at this stage that they always multiply the ones first and note down their answer followed by the tens which they note below.
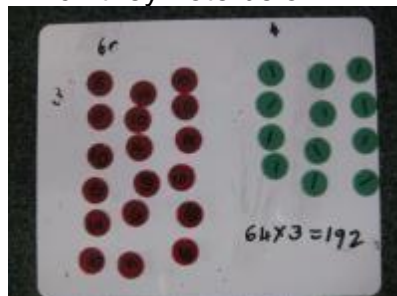
64x3=192 | Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods.
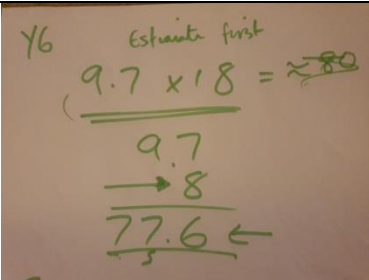
 | Start with long multiplication, reminding the children about lining up their numbers clearly in columns. If it helps, children can write out what they are solving next to their answer.

$$\begin{array}{r} 32 \\ \times\ 24 \\ \hline 8 \\ 120 \\ 40 \\ 600 \\ \hline 768 \end{array}$$ (4 x 2) (4 x 30) (20 x 2) (20 x 30)

This moves to the more compact method.

 |

YEAR 6	Multiply decimals. Yr 6 obj Multiply multi-digit numbers up to 4 digits by a 2 digit whole number using the formal written method of long multiplication	-	-	Y6 Estimate first $9.7 \times 18 = \approx 80$ 9.7 $\rightarrow .8$ 77.6 $\leftarrow$

| 23 | 23 | 23 | 23 | 23 | 23 |

?

Mai had to swim 23 lengths, 6 times a week. How many lengths did she swim in one week?

With the counters, prove that 6 x 23 = 138

Find the product of 6 and

23 6 × 23 =

$\square = 6 \times 23$

6   23
× 23   × 6
___   ___
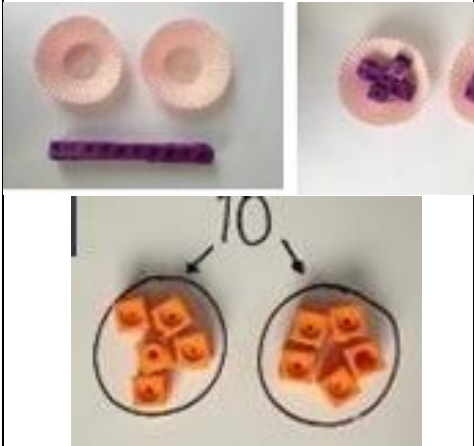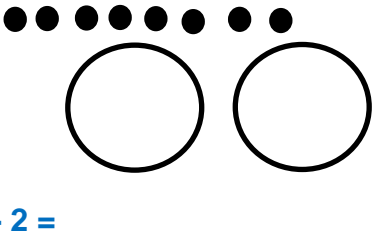
What is the calculation? What is the product?

100s	10s	1s
	●● ●● ●● ●● ●●	●●● ●●● ●●● ●●● ●●●

DIVISION

YEAR	OBJECTIVE	CONCRETE	PICTORIAL	ABSTRACT
EYFS	**ELG** Solve problems including halving and sharing.	Practically share objects into groups using different objects. I have 10 cubes; can you share them equally in 2 groups?	Sharing objects pictorially by drawing spots. **I have 8 sweets and share them with 2 friends.** **8 ÷ 2 =**	**Share 9 buns between three people.** **9 ÷ 3 = 3** Children should also be encouraged to use their 2 times table facts.

YEAR 1	Solve one-step problems in division, calculating the answer.	Count out objects and share into equal groups. Count how many are in each group. Use cubes, counters, objects or place value counters to aid understanding.	Children can represent this pictorially.	Use a number line to show jumps in groups. The number of jumps equals the number of groups.
		Encourage children to write a sum. **10 ÷ 5 =**	**6 ÷ 2 =**	3 groups **6 ÷ 2 = 3**
		Repeated subtraction using Cuisenaire rods above a ruler. **6 ÷ 2 =** 3 groups of 2	Draw repeated subtraction on a number line.	
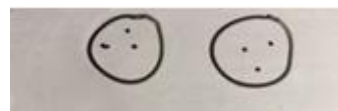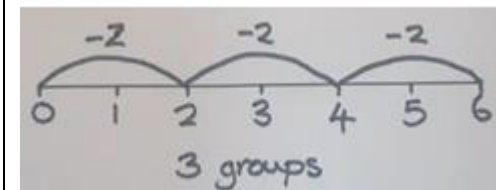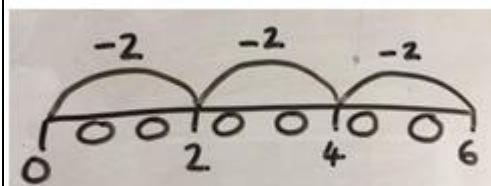
| **YEAR 2** | Solve problems involving division. | Begin by sharing. Count out objects and share into equal groups. Count how many are in each group. Use cubes, counters, objects or place value counters to aid understanding.

15 ÷ 3 = 5
15 ÷ 5 = 3

 | Draw pictorially.

Share 6 sweets into 3 groups.
● ● ● ● ● ●
 | Encourage children to show their working out.
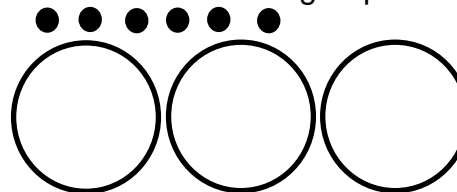
A class of 32 children need a pair of wellies each for their school trip. How many children's wellies will there be in total?

32 ÷ 2 =

Find the inverse of multiplication and division sentences by creating four linking number sentences.

7 x 4 = 28
4 x 7 = 28
28 ÷ 7 = 4
28 ÷ 4 = 7 |

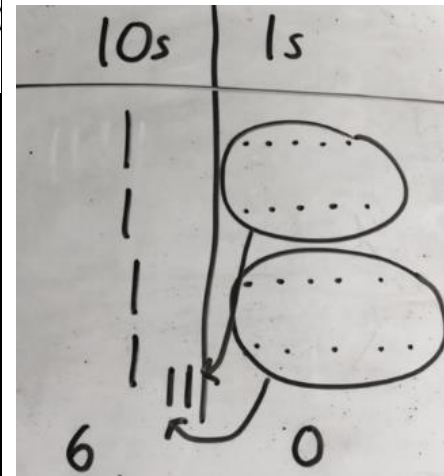| **YEAR 3** | Division with a remainder

Write and calculate mathematical statements for division using the multiplication tables that they know including 2 digit ÷ 1 digit, using mental and progressing to formal written methods. | Use lollipop sticks. Cuisenaire rods, above a ruler can also be used.

13 ÷ 4 =

Use of lollipop sticks to form whole squares are made because we are dividing by 4.
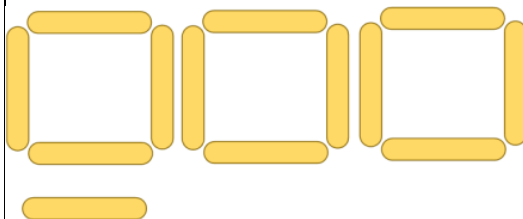
There are 3 whole squares, with 1 left over.

14 ÷ 3 =
Divide objects between groups and see how much is left over
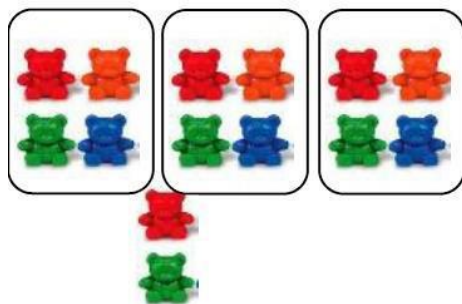
 | Children to represent the lollipop sticks pictorially.
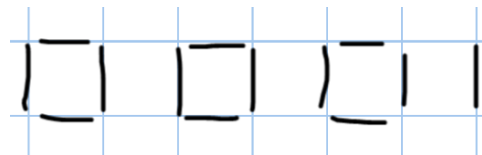
There are 3 whole squares, with 1 left over.

Draw dots and group them to divide an amount and clearly show a remainder.

 | Complete written divisions and show the remainder using r.

29 ÷ 8 = 3 REMAINDER 5
↑   ↑   ↑   ↑
dividend divisor quotient   remainder |

| **YEAR 4/5** | Short division

Yr 4 obj divide 2 digit & 3 digit numbers by a 1 digit number using formal written layout.

Yr 5 obj Divide numbers up to 4 digits by a 1 digit number using the formal written method of short division and interpret remainders appropriately for the context. | Divide a three digit number, then moving to a four digit number, by a one digit number by using partitioning and place value counters.
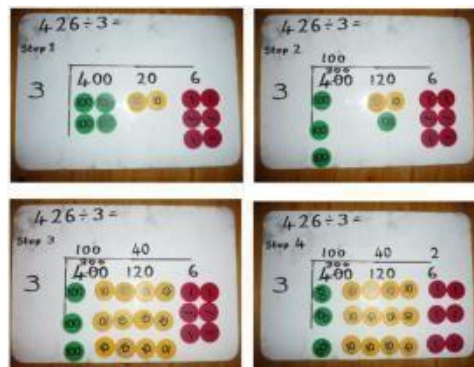
Divide a three digit number, then moving to a four digit number, by a one digit number without partitioning but using place value counters.
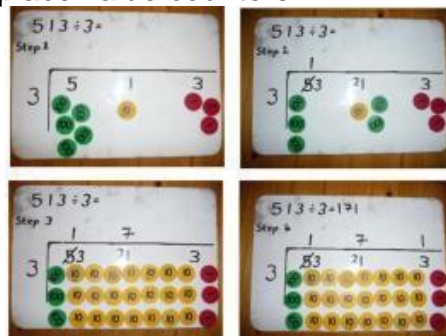
 | Students can continue to use drawn diagrams with dots or circles to help them divide numbers into equal groups.

615 ÷ 5 =
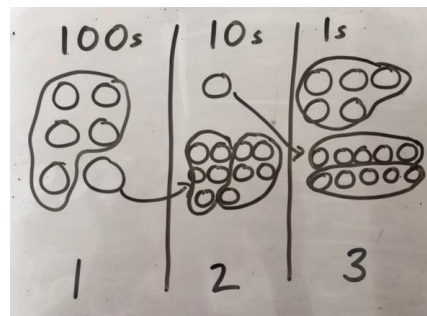
Encourage them to move towards counting in multiples to divide more efficiently.

Represent the place value counters pictorially. | Begin with divisions that divide equally with no remainder.

Move onto divisions with a remainder.

Finally move into decimal places to divide the total accurately. |

YEAR 5/6	Long division Yr6 objective Divide numbers up to 4 digits by a 2 digit whole number using the formal written method of long division and interpret remainders as whole number remainders. Divide numbers up to 4 digits by a 2 digit using the formal written method of short division where appropriate interpreting remainders according to the context.	-	-	$$\begin{array}{r} 1\ \ 4\ .\ 6 \\ 3\ 5\,|\,5\ 1\ \overset{16}{1}\ .\ \overset{21}{0} \end{array}$$

Using the part whole model below, how can you divide 615 by 5 without using short division?
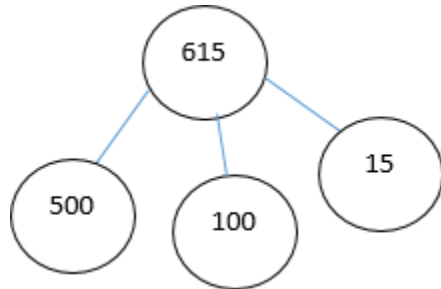
I have £615 and share it equally between 5 bank accounts. How much will be in each account?

615 pupils need to be put into 5 groups. How many will be in each group?

$5\overline{)615}$

615 ÷ 5 =

= 615 ÷ 5

What is the calculation? What is the answer?
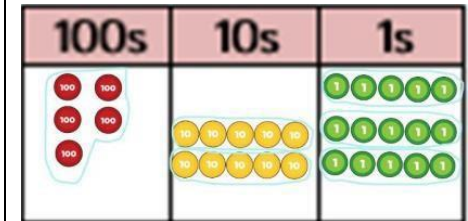
Examples of written calculation with process success criteria:

ADDITION

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

✓ Read the numbers
✓ Write them out in columns
✓ If there is a decimal number, make sure the decimal points line up
✓ Start adding with the smallest column

```
        1 7 2 3
      + 9 8 7 9
      ─────────
      1 1 , 6 0 2
       ₁  ₁ ₁ ₁
```

✓ Add numbers carefully
✓ If a number is more than 9 Write the unit number down and carry the ten number
✓ Continue until the calculation is finished

Subtraction

```
        3 4 8
      - 2 1 5
      ───────
        1 3 3
```

✓ Write out the Calculation
✓ Make sure columns line up

```
     steal  steal
      ⁵  ¹
      8 2 7 3
    - 2 9 4 8
    ─────────
      3 3 2 5
```

✓ Start subtracting with the smallest column
✓ You can't take a larger number from a smaller number so you may need to 'Steal'

To steal you will need to bring numbers across from the Larger column to complete the calculation - e.g.

✓ Continue until you have finished

```
      ⁶ ⁰¹
      6 ⁰7 3  - You can't take
    -   4 8     8 from 3, when
    ─────────   I steal I add
      2 5       10 to 3 to get
              13. Now 13-8=
```


Short Multiplication

```
      5 4 6
    X     4 5
    ───────────
    2 1 8 4
      ₁ ₂
```

✓ Write the numbers in the correct columns
✓ Make sure columns are lined up correctly
✓ Start multiplying the digits with the smallest column

```
      7 0 8
    X     5
    ───────────
    3 , 5 4 0
        ₄
```

✓ If an answer has more than one digit, write the unit number and carry the ten
✓ Remember to add any carried numbers

Short Division

```
      1 3 5 7 r1
    5 )6 7 ¹8 ³6
```

This remainder can also be written as ⅕ (5 is the divisor)

```
      1 3 5 7 · 2
    5 )6 7 ¹8 ³6 · ⁵0
```

✓ Divide into the greater number one digit at a time starting at the left
✓ Put the result of each division on top of the bus stop
✓ If the small number won't go into the digit exactly, carry the remainder
✓ If it won't go at all, put a '0' and carry the whole number
✓ Complete the calculation, any numbers left can be shown as a remainder, a decimal number or a fraction.

Mathematical Vocabulary

The 2014 National Curriculum is explicit in articulating the importance of pupils using the correct mathematical language as a central part of their learning.

This section sets out KS1 and KS2 maths vocabulary under the 2014 National Curriculum.

The tables can be used to check pupils' understanding of new vocabulary introduced in Years 1-6. The lists are intended as a guide to what pupils should know, and are not exhaustive.

New vocabulary should be introduced in a suitable context (for example, with relevant real objects, manipulatives, pictures or diagrams) and explained precisely. High expectations of the mathematical language used are essential, with teachers modelling accurate mathematical vocabulary and expecting pupils' responses to include it *in full sentences.*

RECEPTION

Number and place value	Addition and subtraction	Multiplication and division	Measure	Geometry (position and direction)	Geometry (properties of shape)	Fractions	General/problem solving
Number Zero, one, two, three,…to twenty. Count Before, after, next Equal Double Fewer, less, more First, second, last	Add, altogether, plus, sum, total Minus, subtract, take away Number bond	Group, pair Share	Measure Balance, mass Size Clock, time Cost Distance, length, line, long, short, tall Mass Empty, full	Above, below, between, direction	2D, 3D Circle, rectangle, square, triangle Cube, cuboid, cylinder Corner, edge, curved surface, face, flat, side, straight, surface	Half	Compare, describe, order, sort

Number line, number track Pattern, sequence						

YEAR 1

Number and place value	Addition and subtraction	Multiplication and division	Measure	Geometry (position and direction)	Geometry (properties of shape)	Fractions	General/problem solving
Number Zero, one, two, three to twenty, and beyond None Count (on/up/to/from/down) Before, after More, less, many, few, fewer, least, fewest, smallest, greater, lesser Equal to, the same as Odd, even Pair Units, ones, tens Ten more/less	Number bonds, number line Add, more, plus, make, sum, total, altogether Inverse Double, near double Half, halve Equals, is the same as (including equals sign) Difference between How many more to make..? How many more is…than..? How much	Odd, even Count in twos, threes, fives Count in tens (forwards from/backwards from) How many times? Lots of, groups of Once, twice, three times, five times Multiple of, times, multiply, multiply by Repeated addition Array, row, column Double, halve Share, share equally	Full, half full, empty Holds Container Weigh, weighs, balances Heavy, heavier, heaviest, light, lighter, lightest Scal es Tim e Days of the week: Monday, Tuesday, etc. Seasons: spring, summer, autumn, winter Day, week, month, year, weekend Birthday, holiday Morning, afternoon, evening, night, midnight Bedtime, dinnertime, playtime	Position Over, under, underneath, above, below, top, bottom, side on, in, outside, inside around, in front, behind Front, back Before, after Beside, next to, Opposite Apart Between, middle, edge, centre Corner Directio n Journey Left, right, up, down, forwards,	Group, sort Cube, cuboid, pyramid, sphere, cone, cylinder, circle, triangle, square Shape Flat, curved, straight, round Hollow, solid Corner (point, pointed) Face, side, edge Make, build, draw	Whole Equa l parts , four equa l parts One half, two halves A quarter, two quarters	Listen, join in Say, think, imagine, remember Start from, start with, start at Look at, point to Put, place, fit Arrange, rearrange Change, change over Split, separate Carry on, continue, repeat & what comes next? Find, choose, collect, use, make, build Tell me, describe, pick out, talk about, explain, show me Read, write,

Digit	more is..? Subtract, take away, minus		Today, yesterday, tomorrow Before, after Next, last	backwards, sideways Across			record, trace, copy, complete, finish, end

Numeral Figure(s) Compare (In) order/a different order Size Value Between, halfway between Above, below	How many fewer is…than..? How much less is..?	Group in pairs, threes, etc. Equal groups of Divide, divided by, left, left over	Now, soon, early, late Quick, quicker, quickest, quickly , fast, faster, fastest, slow, slower, slowest, slowly Old, older, oldest, new, newer, newest Takes longer, takes less time Hour, o'clock, half past Clock, watch, hands How long ago? How long will it be to…? How long will it take to…? How often? Always, never, often, sometimes, usually Once, twice First, second, third, etc. Estimate, close to, about the same as, just over, just under Too many, too few, not enough, enough Length, width, height, depth Long, longer, longest, short, shorter shortest, tall, taller, tallest, high, higher, highest Low, wide, narrow, deep, shallow, thick,	Close, far, near Along, through To, from, towards, away from Movement Slide, roll, turn, whole turn, half turn Stretch, bend			Fill in, shade, colour, tick, cross, draw, draw a line between, join (up), ring, arrow Cost Count, work out, answer, check same number(s)/different number(s)/missing number(s) Number facts, number line, number track, number square, number cards Abacus, counters, cubes, blocks, rods, die, dice, dominoes, pegs, peg board Same way, different way, best way, another way In order, in a different order Not all, every, each

			thin				
			Far, near, close				
			Metre, ruler, metre stick				
			Money, coin, penny, pence, pound, price, cost, buy, sell, spend, spent, pay, change, dear(er), costs more, costs less, cheaper, costs the same as				
			How much? How many? Total				

YEAR 2

Number and place value	Measure	Geometry (position and direction)	Geometry (properties of shape)	Fractions	Data/statistics	General/problem solving
Numbers to one hundred Hundreds Partition, recombine Hundred more/less	Quarter past/to m/km, g/kg, ml/l Temperature (degrees)	Rotation Clockwise, anticlockwise Straight line Ninety degree turn, right angle	Size Bigger, larger, smaller Symmetrical, line of symmetry Fold Match Mirror line, reflection Pattern, repeating pattern	Three quarters, one third, a third Equivalence, equivalent	Count, tally, sort Vote Graph, block graph, pictogram, Represent Group, set, list, table Label, title Most popular, most common, least popular, least common	Predict Describe the pattern, describe the rule Find, find all, find different Investigate

YEAR 3

Number and place value	Addition and subtraction	Multiplication and division	Measure	Geometry (position and direction)	Geometry (properties of shape)	Fractions	Data/statistics
Numbers to one thousand	Column addition and subtraction	Product Multiples of four, eight, fifty and one hundred Scale up	Leap year Twelve-hour/twenty-four- hour clock Roman numerals I to XIII	Greater/less than ninety degrees Orientation (same orientation, different orientation)	Horizontal, perpendicular and parallel lines	Numerator, denominator Unit fraction, non-unit fraction Compare and order Tenths	Chart, bar chart, frequency table, Carroll diagram, Venn diagram Axis, axes Diagram

YEAR 4

Number and place value	Addition and subtraction	Multiplication and division	Measure	Geometry (position and direction)	Geometry (properties of shape)	Fractions	Data/statistics
Tenths, hundredths Decimal (places) Round (to nearest) Thousand more/less than Negative integers Count through zero Roman numerals (I to C)		Multiplication facts (up to 12x12) Division facts Inverse Derive	Convert	Coordinates Translation Quadrant x-axis, y-axis Perimeter and area	Quadrilaterals Triangles Right angle, acute and obtuse angles	Equivalent decimals and fractions	Continuous data Line graph

YEAR 5

Number and place value	Addition and subtraction	Multiplication and division	Measure	Geometry (position and direction)	Geometry (properties of shape)	Fractions, decimals and percentages
Powers of 10	Efficient written method	Factor pairs Composite numbers, prime number, prime factors, square number, cubed number Formal written method	Volume Imperial units, metric units	Reflex angle Dimensions	Regular and irregular Polygons	Proper fractions, improper fractions, mixed numbers Percentage Half, quarter, fifth, two fifths, four fifths Ratio, proportion

YEAR 6

Number and place value	Addition and subtraction	Multiplication and division	Geometry (position and direction)	Geometry (properties of shape)	Fractions, decimals and percentages	Algebra	Data/statistics
Numbers to ten million	Order of operations	Order of operations Common factors, common multiples	Four quadrants (for coordinates)	Vertically opposite (angles) Circumference, radius, diameter	Degree of accuracy Simplify	Linear number sequence Substitute Variables Symbol Known values	Mean Pie chart Construct

Videos to Support Mathematical Teaching and Learning

Number and Place value:
https://www.ncetm.org.uk/resources/405
34 KS1 – Counting in steps of one and
ten
KS1 – Partitioning in different
ways KS1 – Addition and
Subtraction
KS1 – Using resources to develop fluency and
understanding KS2 – Partitioning (subtraction)

Number facts:
https://www.ncetm.org.uk/resources/405
33 KS1 – Number bonds to ten
KS1 – Consolidation and practice (Addition and
Subtraction) KS1 – Reinforcing Table Facts
KS1 – Rapid recall of multiplication facts

https://toolkit.mathematicsmastery.org/cpd/progression-in-
calculations KS1 – Deriving new facts from known number bonds
KS1 – Part-whole doubling
KS1 – Near doubling with a bead string
KS1 – Near doubling with part-whole and
Dienes KS2 – Factor bugs

https://toolkit.mathematicsmastery.org/cpd/videos/modelling-
representations Year 3 – Using known facts to add and subtract mentally

Addition:
https://toolkit.mathematicsmastery.org/cpd/progression-in-calculations

KS1 – Addition by partitioning (no
regrouping) KS1 – Addition by partitioning
(regrouping)
KS1 – Representing mental subtraction of tens and ones using Dienes on a part-
whole model KS1 – Representing mental addition of tens and ones using Dienes on
a part-whole model KS1 – Column addition, with and without regrouping, with Dienes
and a place value chart KS2 – Adding and subtracting near multiples
KS2 – Adding near doubles
KS2 – Column addition with Dienes (including regrouping)
KS2 – Partitioning to add using a number line (with regrouping)
KS2 – Partitioning both numbers to add using a number line (no
regrouping) KS2 – Partitioning to subtract using a number line
KS2 – Column addition using place value counters

https://toolkit.mathematicsmastery.org/cpd/videos/modelling-representations
Year 3 – Column addition and subtraction with regrouping

Subtraction:
https://www.ncetm.org.uk/resources/405
32 Lower KS2 – Partitioning
Lower KS2 – Discussing Subtraction
Strategies Lower KS2 – Developing
Column Subtraction Upper KS2 – Column
Subtraction

https://toolkit.mathematicsmastery.org/cpd/videos/modelling-
representations Year 3 – Column addition and subtraction with
regrouping

https://toolkit.mathematicsmastery.org/cpd/progression-in-calculations
KS1 – Column subtraction, with and without regrouping, with Dienes and a place
value chart KS2 – Adding and subtracting near multiples
KS2 – Column subtraction with Dienes (regrouping over
zero) KS2 – Column subtraction with Dienes
(regrouping)
KS2 – Column subtraction using place value counters

Multiplication:

https://www.ncetm.org.uk/resources/40530

KS1 – Multiple Representations of
Multiplication KS1 – The commutative law
for multiplication
Lower KS2 – Grid multiplication as an interim
step Upper KS2 – Moving from grid to a
column

https://toolkit.mathematicsmastery.org/cpd/progression-in-
calculations KS1 – Arrays in multiplication and division
KS1 – Part-whole multiplication and
division (1) KS1 – Part-whole multiplication
and division (2)
KS2 – Multiplication and division (sharing) using place value
counters KS2 – Multiplication by a 2-digit multiplier using place
value counters KS2 – Short multiplication using Dienes

Division:

https://www.ncetm.org.uk/resources/435
89 KS1 – Sharing and grouping
KS2 – Place value counters for
division KS3 – Group working on
problems*

https://toolkit.mathematicsmastery.org/cpd/progression-in-
calculations KS1 – Division as grouping or sharing
KS1 – Part-whole multiplication and
division (1) KS1 – Part-whole multiplication
and division (2)
KS2 – Multiplication and division (sharing) using place value
counters KS2 – Division (grouping) using place value counters
KS2 – Long division using place value
counters KS2 – Long division using
Dienes

Algebra:
https://www.ncetm.org.uk/resources/43649
KS1 – Look at missing numbers
KS2 – Equations and substitution
KS3 - Factorising

Decimals:
https://toolkit.mathematicsmastery.org/cpd/progression-in-calculations KS2 – Understanding decimal places
KS2 – Reassigning the bead string as 1 to understand
decimals KS2 – Comparing decimals

Fractions:
https://www.ncetm.org.uk/resources/436
09 KS1 – Adding fractions and mixed
numbers KS2 – Using an array to add
fractions
KS2 – Bar model dividing by
fractions KS3 – Fraction wall to
add fractions*

https://toolkit.mathematicsmastery.org/cpd/progression-in-calculations KS1 – Writing fractions
KS1 – Relating fractions to division
KS1 – Unit and non-unit fractions of a
quantity KS2 – Finding fractions using
Cuisenaire rods
KS2 – Representing fractions less than one with Cuisenaire rods

Multiplicative Reasoning:
https://www.ncetm.org.uk/resources/436
69 KS2 – Bar model for multiplication
KS3 – Ratio and proportion*

Videos to Support Mathematical Teaching and Learning

Number and Place value:
https://www.ncetm.org.uk/resources/405
34 KS1 – Counting in steps of one and
ten
KS1 – Partitioning in different
ways KS1 – Addition and
Subtraction
KS1 – Using resources to develop fluency and
understanding KS2 – Partitioning (subtraction)

Number facts:
https://www.ncetm.org.uk/resources/405
33 KS1 – Number bonds to ten
KS1 – Consolidation and practice (Addition and
Subtraction) KS1 – Reinforcing Table Facts
KS1 – Rapid recall of multiplication facts

https://toolkit.mathematicsmastery.org/cpd/progression-in-
calculations KS1 – Deriving new facts from known number bonds
KS1 – Part-whole doubling
KS1 – Near doubling with a bead string
KS1 – Near doubling with part-whole and
Dienes KS2 – Factor bugs

https://toolkit.mathematicsmastery.org/cpd/videos/modelling-
representations Year 3 – Using known facts to add and subtract mentally

Addition:
https://toolkit.mathematicsmastery.org/cpd/progression-in-calculations

KS1 – Addition by partitioning (no
regrouping) KS1 – Addition by partitioning
(regrouping)
KS1 – Representing mental subtraction of tens and ones using Dienes on a part-
whole model KS1 – Representing mental addition of tens and ones using Dienes on
a part-whole model KS1 – Column addition, with and without regrouping, with Dienes
and a place value chart KS2 – Adding and subtracting near multiples
KS2 – Adding near doubles
KS2 – Column addition with Dienes (including regrouping)
KS2 – Partitioning to add using a number line (with regrouping)
KS2 – Partitioning both numbers to add using a number line (no
regrouping) KS2 – Partitioning to subtract using a number line
KS2 – Column addition using place value counters

https://toolkit.mathematicsmastery.org/cpd/videos/modelling-representations
Year 3 – Column addition and subtraction with regrouping

Subtraction:
https://www.ncetm.org.uk/resources/405
32 Lower KS2 – Partitioning
Lower KS2 – Discussing Subtraction
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https://toolkit.mathematicsmastery.org/cpd/videos/modelling-
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