HANDFORD HALL PRIMARY SCHOOL

CALCULATION POLICY

This policy, having been presented to, and agreed upon, by the whole staff,
And the Governors and will be distributed to:

- All teaching staff
- School governors

A copy of the policy will also be available in:

- The School office
- School web site

This will ensure that the policy is readily available to visiting teachers, support staff and parents.

Written Methods of Calculation Policy

This policy has been updated to take into account the changes in the National Curriculum (2014).

Using Written Methods

Written methods are used to support a pupil who is unable to perform on of the four operations mentally and to help pupils to explain their methods of working out. It is good practice when first introducing a method for the range of numbers to be within what the pupil can calculate mentally so they can self-assess their success at using a method. However, once pupils are able to perform a written method successfully they should only select to use it with numbers which lie outside the range in which they can calculate mentally.

Progression of Written Methods

The written methods for each of the four operations are progressive and build upon skills and knowledge acquired through successfully achieving the age-expected outcomes from previous year groups. A pupil should not be targeted at achieving an age-expected method if they are not able to successfully use the method for a previous age-group. As a school we are taking an approach which ensures consistency across the school using the same few methods across both key stages. With this in mind it should be easier for pupils to work on calculations using the method for their appropriate ability.

Handford Hall policies are reviewed annually

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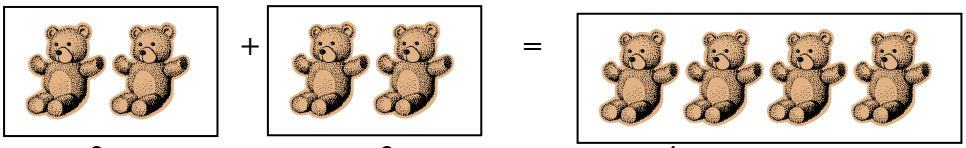
Addition

Songs and action rhymes used.

In the early stages of adding, pupils will use objects to help them add.



2 + 2 = 4

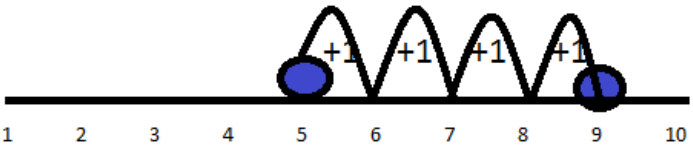
Pupils will move onto using practical apparatus to help them add. (Numicon, bead strings, cuisenaire rods) Pupils will begin to write written number sentences.

E.g. 2 + 3 = 5 2 + ___ = 5

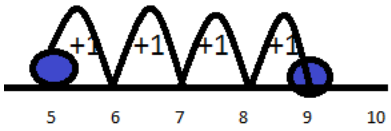
Once pupils are able to add using the above methods, they will move onto teacher-led methods of number line.

E.g. 5 + 4 =

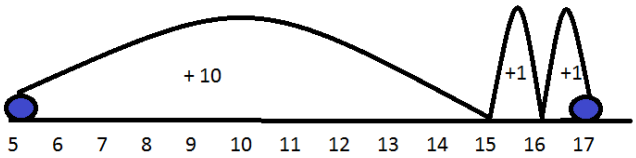
Pupils find the number 5 and count on 4 to find the answer.



Once confident with this, pupils' will move onto using a number line starting with the initial number. E.g 5 + 4 =



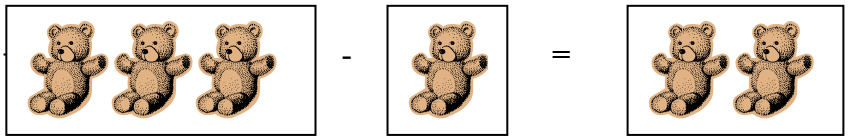
When pupils can do this, they will move onto larger numbers and use their knowledge of adding 10 to make the least number of jumps. E.g. 5 + 12 =



Subtraction

Songs and action rhymes used

In the early stages of subtraction, pupils will use objects to help them take away.



3 - 1 = 2

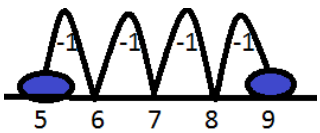
Pupils will move onto using practical apparatus to help them subtract. (Numicon, bead strings, cuisenaire rods) Pupils will begin to write written number sentences.

E.g. 5 - 3 = 2 5 - ___ = 2

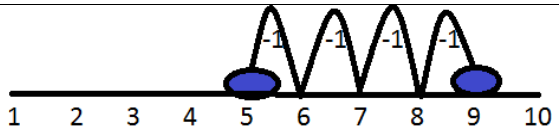
Once pupils are able to subtract using the above methods, they will move onto teacher-led methods of number line.

E.g. 9 - 4 = pupils find the number 9 and count back 4 to find the answer.

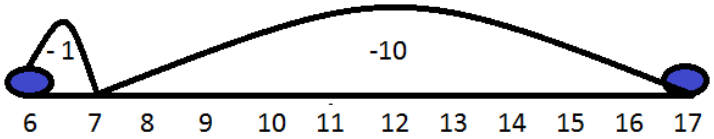
Once confident with this, pupils' will move onto using a number line starting with the initial number. E.g 9 – 4 =



When pupils will move and use their

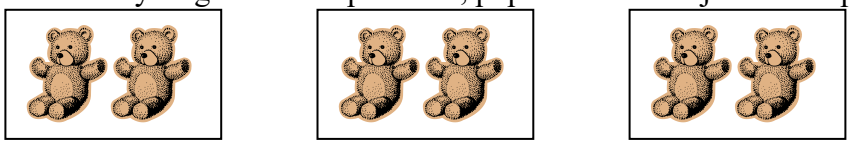


can do this, they onto larger numbers knowledge of subtracting 10 to make the least number of jumps. E.g. 17 – 11 =



Multiplication

In the early stages of multiplication, pupils will use objects to help them make



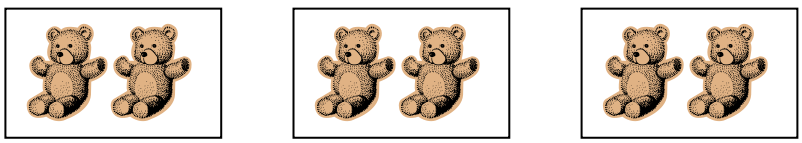
E.g. Pupils can count 2, 4, 6. There are 3 groups of 2 and 6 altogether.

Pupils will move onto using practical apparatus to help them multiply. (Numicon, bead strings, cuisenaire rods). They can verbally discuss what patterns they notice. E.g. 2 yellows (3) makes a light blue (6).

Teacher may model 3 x 2 = 6 where it is appropriate. (Addition and subtraction signs need to be secure first).

Division

In the early stages of division, pupils will use objects and share them out. Pupils can talk about how many there were to start with and how many they have each after sharing them.



E.g. There were 6 bears altogether and we shared them with 3 people and we got 2 each. Teacher may model vocabulary 'share'. E.g. 6 shared by 3 = 2 where it is appropriate. (Addition and subtraction signs need to be secure first).
Key vocabulary for Reception pupils **Add – Plus – More** **Take Away – Minus – Less** **Times– groups of – lots of** **Share – divide**
Resources to aid learning Numicon – Bead strings – Cuisenaire – Everyday objects – Number lines – Counting objects – Mathletics – Role Play Area – Coins.

Year 1

Number (Addition and Subtraction)

Statutory requirements

Pupils should be taught to:

- read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs
- represent and use number bonds and related subtraction facts within 20
- add and subtract one-digit and two-digit numbers to 20, including zero
- solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = ☐ – 9.

Number (Multiplication and Division)

Statutory requirements

Pupils should be taught to:

- 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.

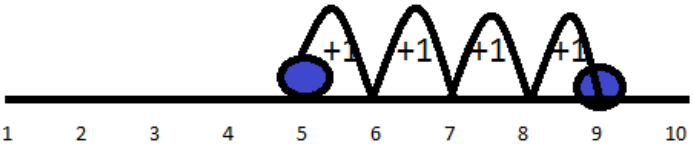
Addition

Pupils will use practical apparatus to help them add. (Numicon, bead strings, cuisenaire rods) Pupils will begin to write written number sentences.

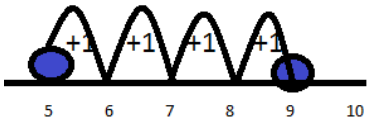
E.g. 2 + 3 = 5 2 + ___ = 5

Once pupils are able to add using the above methods, they will move onto teacher-led methods of number line.

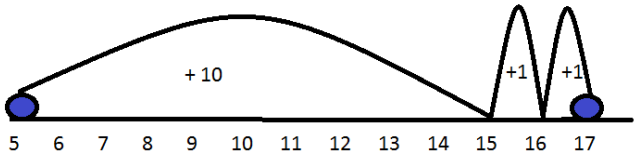
E.g. 5 + 4 = Pupils find the number 5 and count on 4 to find the answer.



Once confident with this, pupils' will move onto using a number line starting with the initial number. E.g 5 + 4 =



When pupils can do this, they will move onto larger numbers and use their knowledge of adding 10 to make the least number of jumps. E.g. 5 + 12 =



When pupils are confident with the number system (1 more and less and 10 more or less) they can use a 100 number square to find the solutions to their questions.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

E.g. 5 + 12 = ?

5 + 10 = 15

15 + 2 = 17

Pupils should then be able to apply their knowledge of number bonds to 20, to solve one step word problems, including missing number problems.

E.g. 11 = □ + 9

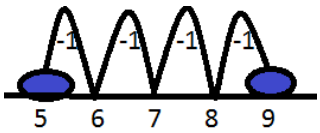
Subtraction

Pupils will use practical apparatus to help them subtract. (Numicon, bead strings, cuisenaire rods) Pupils will begin to write written number sentences.

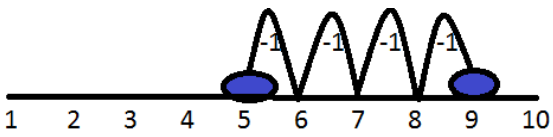
E.g. 5 - 3 = 2 5 - ___ = 2

Once pupils are able to subtract using the above methods, they will move onto teacher-led methods of number line.

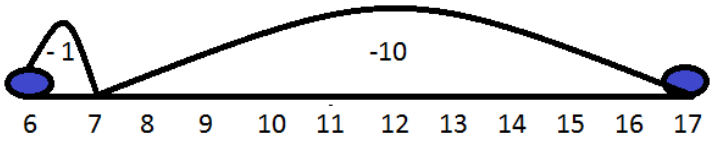
E.g. 9 - 4 = Pupils find the number 9 and count back 4 to find the answer.



Once confident with this, pupils' will move onto using a number line starting with the initial number. E.g 9 – 4 =



When pupils can do this, they will move onto larger numbers and use their knowledge of subtracting 10 to make the least number of jumps. E.g. 17 – 11 =



When pupils are confident with the number system (1 more and less and 10 more or less) they can use a 100 number square to find the solutions to their questions.

E.g. 17 – 12 = ?

17 – 10 = 7

7 – 2 = 5

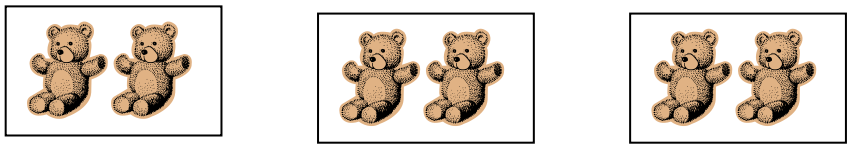
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Pupils should then be able to apply their knowledge of number bonds to 20, to solve one step word problems, including missing number problems.

E.g. 7 = ☐ - 9

Multiplication

In the early stages of multiplication, pupils will use objects to help them make groups of.



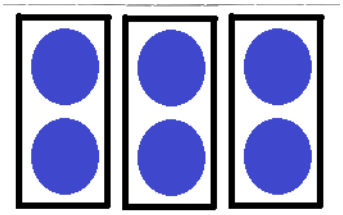
E.g. Pupils can count 2, 4, 6. There are 3 groups of 2 and 6 altogether.

Pupils will move onto using practical apparatus to help them multiply. (Numicon, bead strings, cuisenaire rods). They can verbally discuss what patterns they notice. E.g. 2 yellows (3) makes a light blue (6).

Teacher may model using repeated addition and then using the language groups of or lots of.

E.g. 2 + 2 + 2 = 6 and explain we can also write it as 3 groups of 2 or 3 lots of 2 where it is appropriate. (Addition and subtraction signs need to be secure first).

When pupils understand the idea of multiplying they can begin to use arrays and the written vocabulary to demonstrate their understanding.

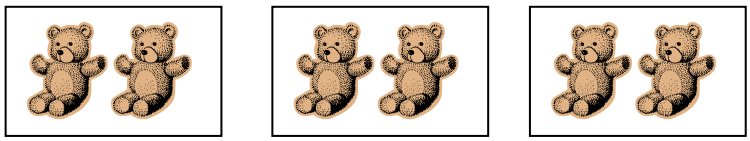


2 + 2 + 2 = 6

3 groups of 2 = 6

Division

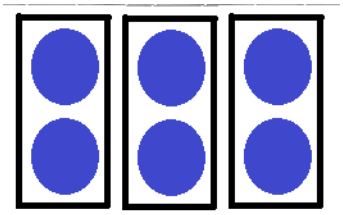
In the early stages of division, pupils will use objects and share them out. Pupils can talk about how many there were to start with and how many they have each after sharing them.



E.g. There were 6 bears altogether and we shared them with 3 people and we got 2 each.

Teacher may model vocabulary 'share'. E.g. 6 shared by 3 = 2 where it is appropriate. (Addition and subtraction signs need to be secure first).

When pupils understand the idea of sharing they can begin to use arrays and the written vocabulary to demonstrate their understanding.



1 2 3

6 shared by 3 = 2

Key vocabulary for Year 1 pupils

Add – Plus – More – Put together – Total – More than

Take Away – Minus – Less – Distance between – Difference between – Less than

Times– Groups of – Lots of

Share – Divide

Resources to aid learning

Numicon – Bead strings – Cuisenaire – Everyday objects – Number lines – Counting objects – Mathletics – Role Play Area – Coins.

Year 2

Number (Addition and Subtraction)

Statutory requirements

Pupils should be taught to:

- solve problems with addition and subtraction:
- using concrete objects and pictorial representations, including those involving numbers, quantities and measures
- applying their increasing knowledge of mental and written methods
- recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100
- add and subtract numbers using concrete objects, pictorial representations, and mentally, including:
- a two-digit number and ones
- a two-digit number and tens
- two two-digit numbers
- adding three one-digit numbers
- show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot
- recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.

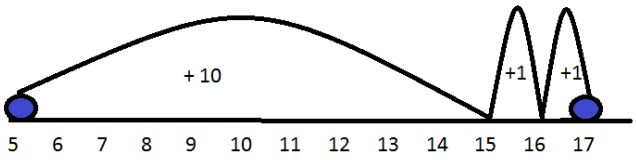
Number (Multiplication and Division)

Statutory requirements

- Pupils should be taught to:
- recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
- calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) 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.

Addition

When pupils are confident with the methods outlined in Reception and Year 1, pupils will move onto larger numbers and use their knowledge of adding 10 to make the least number of jumps. E.g. 5 + 12 =



When pupils are confident with the number system (1 more and less and 10 more or less) they can use a 100 number square to find the solutions to their questions.

E.g. 5 + 12 = ?

5 + 10 = 15

15 + 2 = 17

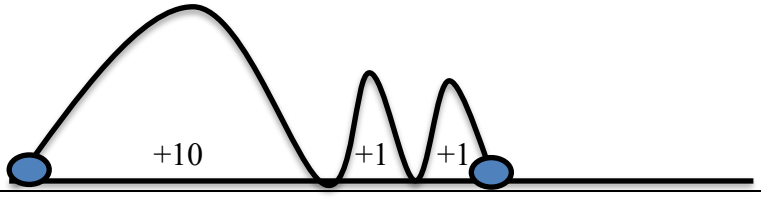
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Pupils should be able to apply their knowledge of number bonds to 20, to solve one step word problems, including missing number problems and working out the inverse.

E.g. 11 = ☐ + 9

Pupils will then move onto using an Empty Number Line (ENL) by selecting the biggest number to go first and then adding the smaller number by partitioning it into tens and units.

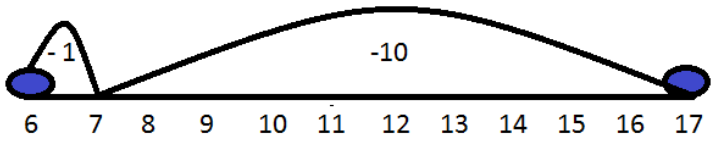
e.g. 14+12 =



14 24 25 26

Subtraction

When pupils can do this, they will move onto larger numbers and use their knowledge of subtracting 10 to make the least number of jumps. E.g. 17 – 11 =



When pupils are confident with the number system (1 more and less and 10 more or less) they can use a 100 number square to find the solutions to their questions.

E.g. 17 – 12 = ?

17 – 10 = 7

7 – 2 = 5

Pupils should then be able to apply their knowledge of number bonds to 20, to solve one step word problems, including missing number problems and working out the inverse.

Through all of the above examples, it is important to show pupils that subtracting is not commutative (cannot be done in any order).

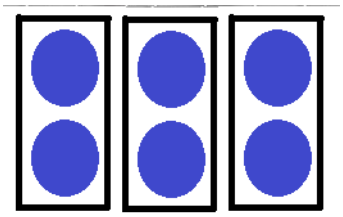
Multiplication

Pupils will move onto using practical apparatus to help them multiply. (Numicon, bead strings, cuisenaire rods). They can verbally discuss what patterns they notice. E.g. 2 yellows (3) makes a light blue (6).

Teacher may model using repeated addition and then using the language groups of or lots of.

E.g. 2 + 2 + 2 = 6 and explain we can also write it as 3 groups of 2 or 3 lots of 2 where it is appropriate. (Addition and subtraction signs need to be secure first).

When pupils understand the idea of multiplying they can begin to use arrays and the written vocabulary to demonstrate their understanding.



2 + 2 + 2 = 6

3 groups of 2 = 6

As pupils understand multiplication as lots of or groups of, teachers can introduce the x sign.

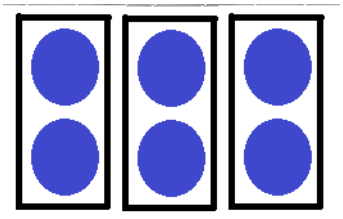
Pupils will begin using this in the same way as the previous example by adding the written sentence 3 x 2 = 6.

Once pupils are fully comfortable with recognising and using the x sign can they move onto solving multiplication questions such as 2 x 4 = __

When teaching multiplication using symbols, it is important to show pupils that multiplication is commutative (can be done in any order).

Division

When pupils understand the idea of sharing they can begin to use arrays and the written vocabulary to demonstrate their understanding.



1 2 3

6 shared by 3 = 2

As pupils understand division as **sharing** into groups, teachers can introduce the ÷ sign.

Pupils will begin using this in the same way as the previous example by adding the written sentence 6 ÷ 3 = 2

Once pupils are fully comfortable with recognising and using the ÷ sign can they move onto solving division questions such as 8 ÷ 2 = ____

When teaching division using symbols, it is important to show pupils that division is not commutative (cannot be done in any order).

Key vocabulary for Year 2 pupils

Add – Plus – More – Put together – Total – More than

Take Away – Minus – Less – Distance between – Difference between – Less than

Times– Groups of – Lots of

Share – Divide

Resources to aid learning

Numicon – Bead strings – Cuisenaire – Everyday objects – Number lines – Counting objects – Mathletics – Coins.

Year 3

Number (Addition and Subtraction)

Statutory requirements

Pupils should be taught to:

- add and subtract numbers mentally, including:
  a three-digit number and ones
  a three-digit number and tens
  a three-digit number and hundreds
- add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction
- estimate the answer to a calculation and use inverse operations to check answers
- solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.

Number (Multiplication and Division)

Statutory requirements

Pupils should be taught to:

- recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables
- write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods
- solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.

Addition

Once pupils are confident with using the 100 number square, they will then move onto partitioning without the 100 square as a guide and set it out in the same way.

E.g. 12 + 14 =

12 + 10 = 22

22 + 4 = 26

(Follow this order: 2-digit number and units – e.g. 12 + 4 (adding 4 units)

2-digit number and tens – e.g. 12 + 20 (adding 2 tens)

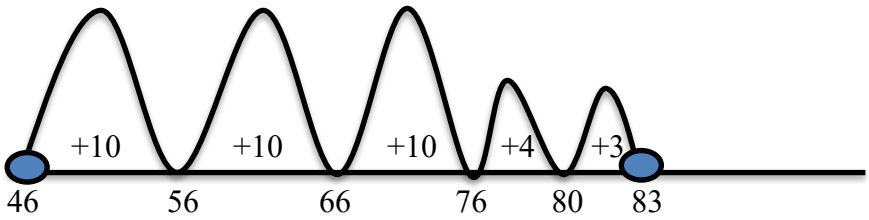
TU + TU – e.g. 12 + 24

Adding 3 1-digit numbers – e.g. 4 + 5 + 2

Through all of the above examples, it is important to show pupils the adding is commutative (can be done in any order).

When pupils are secure with partitioning, they can begin to use an ENL to count on.

E.g. 37 + 46 =



Bridging ten mentally:

37 + 46 or

70 + 13

80 + 3

= 83

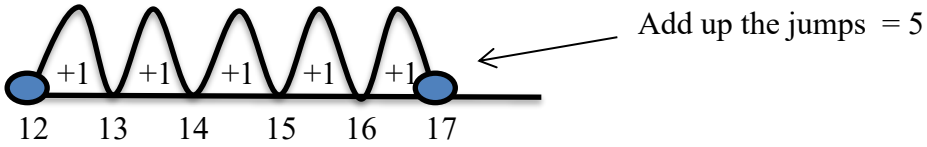
37 + 46
77 + 6
= 83

Encourage keeping the biggest number whole.

Subtraction

Once pupils are confident with using the 100 number square to solve subtraction problems they will then move onto using an ENL to **find the difference.**

E.g. 17 - 12 = ?



(Follow this order: 2-digit number and units – e.g. 12 - 4 (subtracting 4 units)

2-digit number and tens – e.g. 32 + 20 (subtracting 2 tens)

TU - TU – e.g. 52 - 24

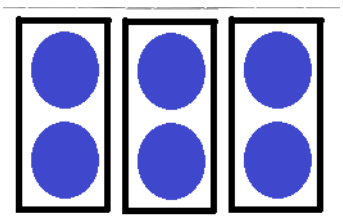
Subtracting 3 1-digit numbers – e.g. 20 – 4 – 5 = 11

Through all of the above examples, it is important to show pupils that subtracting is not commutative (can not be done in any order).

Multiplication

As pupils understand multiplication as lots of or groups of, teachers can introduce the x sign.

Pupils will begin using this in the same way as the example below by adding the written sentence 3 x 2 = 6.



2 + 2 + 2 = 6

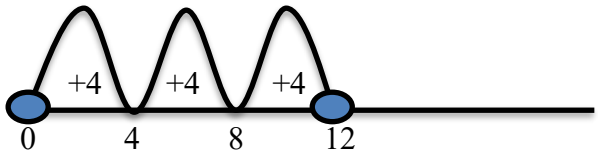
3 groups of 2 = 6

3 x 2 = 6

Once pupils are fully comfortable with recognising and using the x sign can they move onto solving multiplication questions such as 2 x 4 = __

When teaching multiplication using symbols, it is important to show pupils that multiplication is commutative (can be done in any order).

3 x 4 =



Pupils should start to look at simple inverses next and know the corresponding multiplication and division facts for 2, 3, 4, 5, 8 and 10 times table. E.g 3 x 5 = 15 so 15 ÷ 5 = 3. (These should include missing number problems.)

Pupils should begin to use simple written methods for multiplication (grid method) including TU x U

e.g. 12 x 5 =

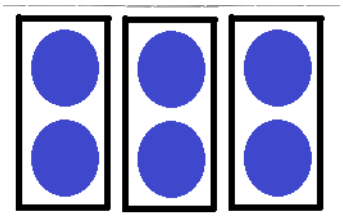
X	10	2
5	50	10

50 + 10 = 60

Division

As pupils understand division as sharing into groups, teachers can introduce the ÷ sign.

Pupils will begin using this in the same way as example below by adding the written sentence 6 ÷ 3 = 2



1 2 3

6 shared by 3 = 2

6 ÷ 3 = 2

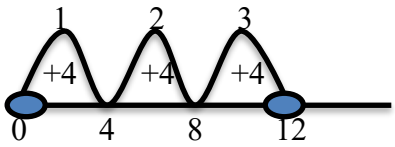
Once pupils are fully comfortable with recognising and using the ÷ sign can they move onto solving division questions such as 8 ÷ 2 = ____

When teaching division using symbols, it is important to show pupils that division is not commutative (cannot be done in any order).

Pupils should start to look at simple inverses next and know the corresponding multiplication and division facts for 2, 3, 4, 5, 8 and 10 times table. E.g 3 x 5 = 15 so 15 ÷ 5 = 3. (These should include missing number problems.)

Pupils should begin to use written methods on an ENL for division

e.g. 12 ÷ 4 =



Count how many jumps of 4 to get to 12

Key vocabulary for Year 3 pupils

Add – Plus – More – Put together – Total – More than – Addition – Sum

Take Away – Minus – Less – Distance between – Difference between – Less than - Subtract

Times– Groups of – Lots of - Multiply

Share – Divide - Equal

Resources to aid learning

Numicon – Bead strings – Cuisenaire – Everyday objects – Number lines – Counting objects – Mathletics – Coins.

Year 4

Number (Addition and Subtraction)

Statutory requirements

Pupils should be taught to:

- add and subtract numbers with up to 4 digits using the formal written methods of column addition and subtraction where appropriate
- estimate and use inverse operations to check answers to a calculation
- solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.

Number (Multiplication and Division)

Statutory requirements

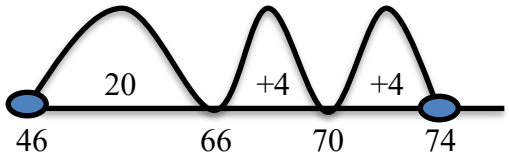
Pupils should be taught to:

- recall multiplication and division facts for multiplication tables up to 12 × 12
- use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers
- recognise and use factor pairs and commutativity in mental calculations
- multiply two-digit and three-digit numbers by a one-digit number using formal written layout
- solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.

Addition

When pupils are secure with partitioning, they can use the ENL for addition.

e.g. 46 + 28 =



Teachers can move onto HTU + TU without bridging 10 and then bridging 10 using the column addition method.

Then onto HTU + HTU without bridging 10 and then bridging 10 using the column addition method and again with ThHTU.

Then onto decimals (u.t + u.t)

When pupils are secure with the ENL they can begin to move onto column addition method.

Throughout year 4, pupils should be taught and expected to use the inverse for all 4 operations to check their work.

Subtraction

Pupils continue to 'find the difference' on an ENL.

Throughout year 4, pupils should be taught and expected to use the inverse for all 4 operations to check their work.

Multiplication

Once pupils are fully comfortable with recognising and using the x sign can they move onto solving multiplication questions such as 2 x 4 = __ and 2 x __ = 8

When teaching multiplication using symbols, it is important to show pupils that multiplication is commutative (can be done in any order).

Pupils should start to look at simple inverses next and know the corresponding multiplication and division facts up to 12 x 12. E.g 3 x 5 = 15 so 15 ÷ 5 = 3. (These should include missing number problems.)

Pupils should continue to use the grid method to solve multiplication (TU x U)

Once secure with this, pupils would carry out HTU X U in exactly the same way.

If confident they can start to solve these using the expanded bracket method.

12		Begin with the bottom number, units first and write your brackets.
x 5		(Multiply bottom units by top units.)
10	(5 x 2)	(Multiply bottom units by top tens)
50	(5 x 10)	Solve each bracket. Where there is 0 present in the brackets transfer this straight over into the answer. E.g. 5 x 10. Cross out the 0 and put in the U column and work out 5 x 1.
60		Add your answers together using column addition.

Throughout year 4, pupils should be taught and expected to use the inverse for all 4 operations to check their work.

Division

Once pupils are fully comfortable with recognising and using the ÷ sign can they move onto solving division questions such as 8 ÷ 2 = ____

When teaching division using symbols, it is important to show pupils that division is not commutative (cannot be done in any order).

Pupils should start to look at simple inverses next and know the corresponding multiplication and division facts up to 12 x 12. E.g 3 x 5 = 15 so 15 ÷ 5 = 3. (These should include missing number problems.)

Pupils should begin to use simple written methods for division including TU ÷ U. They should solve these using the bus stop method without remainders.

E.g. 65 ÷ 5 = 13

$$\begin{array}{r} 1\ 3 \\ 5\overline{)\ 6\ {}^{1}5} \end{array}$$

Pupils should then move onto TU ÷ U with remainders and then onto HTU ÷ U using the same method without remainders and then with remainders.

Throughout year 4, pupils should be taught and expected to use the inverse for all 4 operations to check their work.

Key vocabulary for Year 4 pupils

Add – Plus – More – Put together – Total – More than – Addition – Sum

Take Away – Minus – Less – Distance between – Difference between – Less than - Subtract

Times– Groups of – Lots of - Multiply

Share – Divide - Equal

Resources to aid learning

Bead strings – Cuisenaire – Everyday objects – Number lines – Counting objects – Mathletics – Coins.

Year 5

Number (Addition and Subtraction)

Statutory requirements

Pupils should be taught to:

- add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)
- add and subtract numbers mentally with increasingly large numbers
- use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
- solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.

Number (Multiplication and Division)

Statutory requirements

Pupils should be taught to:

- identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers
- know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers
- establish whether a number up to 100 is prime and recall prime numbers up to 19
- multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers
- multiply and divide numbers mentally drawing upon known facts
- divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context
- multiply and divide whole numbers and those involving decimals by 10, 100 and 1000
- recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3})

- solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes
- solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign
- solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.

Addition

If secure with the ENL pupils should be working on HTU + TU without bridging 10 and then bridging 10 using the column addition method.

```
  126
+  79
  205
   1 1
```

Then onto HTU + HTU without bridging 10 and then bridging 10 using the column addition method and again with ThHTU or more.

When pupils are secure with the column addition method, they may begin to add numbers to 1 decimal place using the column addition and move onto 2 decimal places.

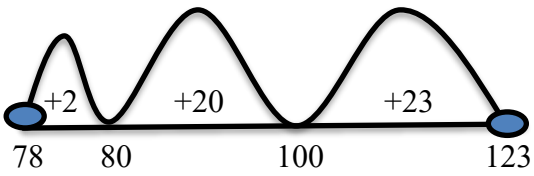
Throughout year 5, pupils should be taught and expected to use the inverse for all 4 operations to check their work.

Subtraction

Pupils should continue to use the ENL for subtraction.

e.g. 123 – 78 =

23 + 20 + 2 = 45



Throughout year 5, pupils should be taught and expected to use the inverse for all 4 operations to check their work.

Multiplication

Pupils should be looking at simple inverses next and know the corresponding multiplication and division facts up to 12 x 12. E.g 3 x 5 = 15 so 15 ÷ 5 = 3. (These should include missing number problems.)

Pupils should use the grid method for multiplication including TU x U. When secure they should solve these using the expanded bracket method.

```
  12
x  5
  10     (5 x 2)
  50     (5 x 10)
  60
```

Begin with the bottom number, units first and write your brackets.
(Multiply bottom units by top units.)
(Multiply bottom units by top tens)
Solve each bracket. Where there is 0 present in the brackets transfer this straight over into the answer. E.g. 5 x 10. Cross out the 0 and put in the U column and work out 5 x 1.
Add your answers together using column addition.

Once secure with this,
pupils would carry out HTU X U in exactly the same way and ThHTU.

When pupils are secure with this, they can move onto TU x TU. The expanded bracket method is used in exactly the same way but more brackets will be required.

E.g. 12 x 35

```
  12
x 35
  10   ( 5 x 2)
  50   ( 5 x 10)
  60   (30 x 2)
 300   (30 x 10)
 420
 1
```

Begin with the bottom number, units first and write your brackets.
(Multiply bottom units by top units.)
(Multiply bottom units by top tens)
(Multiply bottom tens by top units.)
(Multiply bottom tens by top tens)
Solve each bracket. Where there is 0 present in the brackets transfer this straight over into the answer. E.g. 30 x 10. Cross out the 0's and put in the answer space starting with U column and the T column and work out 3 x 1

If pupils are confident they can move onto using the expanded bracket method to multiply HTU x TU and then ThHTU x TU.

Throughout year 5, pupils should be taught and expected to use the inverse for all 4 operations to check their work.

Division

Pupils should be looking at simple inverses next and know the corresponding multiplication and division facts up to 12 x 12. E.g 3 x 5 = 15 so 15 ÷ 5 = 3. (These should include missing number problems.)

Pupils should begin to use simple written methods for division including TU ÷ U. They should solve these using the bus stop method without remainders.

E.g. 65 ÷ 5 = 13

```
   1  3
5 | 6 1 5
```

Pupils should then move onto solving TU ÷ U with remainders and then move onto HTU ÷ U using the same method and ThHTU without and then with remainders. Remainders should be expressed appropriately. E.g

```
   1  3  r.2
4 | 5 1 4
```

Once remainder is understood can move onto

```
   1  3  2/4
4 | 5 1 4
```

This can then be simplified to 13 ½

This can then be converted to a decimal to make 13.5

Throughout year 5, pupils should be taught and expected to use the inverse for all 4 operations to check their work.

Key vocabulary for Year 5 pupils

Add – Plus – More – Put together – Total – More than – Addition – Sum

Take Away – Minus – Less – Distance between – Difference between – Less than - Subtract

Times– Groups of – Lots of - Multiply

Share – Divide – Equal

Resources to aid learning

Bead strings – Cuisenaire – Everyday objects – Number lines – Counting objects – Mathletics – Coins.

Year 6

Number (Addition, Subtraction, Multiplication and Division)

Statutory requirements

Pupils should be taught to:

- multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context
- divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context
- perform mental calculations, including with mixed operations and large numbers
- identify common factors, common multiples and prime numbers
- use their knowledge of the order of operations to carry out calculations involving the four operations
- solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why
- solve problems involving addition, subtraction, multiplication and division
- use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy

Addition

Teachers can move onto HTU + TU without bridging 10 and then bridging 10 using the column addition method.

$$\begin{array}{r} 123 \\ +\ 46 \\ \hline 169 \end{array} \qquad \begin{array}{r} 123 \\ +\ 49 \\ \hline 172 \end{array}$$

Then onto HTU + HTU without bridging 10 and then bridging 10 using the column addition method and again with ThHTU or more.

When pupils are secure with the column addition method, they may begin to add numbers to 1 decimal place using the column addition

Throughout year 6, pupils should be taught and expected to use the inverse for all 4 operations to check their work.

Subtraction

Pupils use the ENL to solve TU –TU and then again for HTU – HTU. When pupils are secure they can begin to use ThHTU or more.

Throughout year 6, pupils should be taught and expected to use the inverse for all 4 operations to check their work.

Multiplication

Pupils should start to look at simple inverses next and know the corresponding multiplication and division facts for 2 - 12 times table. E.g 3 x 5 = 15 so 15 ÷ 5 = 3.

Pupils should begin to use simple written methods for multiplication including TU x U. They should solve these using the expanded bracket method.

12		Begin with the bottom number, units first and write your brackets.
x 5		(Multiply bottom units by top units.)
10	(5 x 2)	(Multiply bottom units by top tens)
50	(5 x 1 Ø)	Solve each bracket. Where there is 0 present in the brackets transfer this straight over into the answer. E.g. 5 x 10. Cross out the 0 and put in the U column and work out 5 x 1.
60		Add your answers together using column addition.

Once secure with this, pupils would carry out HTU X U in exactly the same way and ThHTU.

When pupils are secure with the expanded bracket method, they can move onto TU x TU. The expanded bracket method is used in exactly the same way but more brackets will be required. E.g. 12 x 35

12		
x 35		Begin with the bottom number, units first and write your brackets.
10	(5 x 2)	(Multiply bottom units by top units.)
50	(5 x 1 Ø)	(Multiply bottom units by top tens)
60	(30 x 2)	(Multiply bottom tens by top units.)
300	(3 Ø x 1 Ø)	(Multiply bottom tens by top tens)
420		Solve each bracket. Where there is 0 present in the brackets transfer this straight over into the answer. E.g. 30 x 10. Cross out the 0's and put in the answer space starting with U column and the T column and work out 3 x 1
1		

If pupils are confident they can move onto using the expanded bracket method to multiply HTU x TU and then ThHTU x TU.

Use Long multiplication method when secure with the formal written method as shown above for anything larger than TU x TU.

Pupils who able to can move onto simple multiplication with decimals. E.g. 15 x 1.5 using the expanded bracket method in the same way and then more complex decimal such as 2.3, 3.6 etc… 4 x 7.23

		x	7	0.2	0.03
4	28	0.8	0.12		= 28.92

Throughout year 6, pupils should be taught and expected to use the inverse for all 4 operations to check their work.

Division

Pupils should start to look at simple inverses next and know the corresponding multiplication and division facts for 2 – 12 times table. E.g 3 x 5 = 15 so 15 ÷ 5 = 3.

Pupils should then move onto solving TU ÷ U with remainders and then move onto HTU ÷ U using the same method and ThHTU without and then with remainders.

$$5\overline{)\,6\ ^{1}6}\quad 1\ \ 3\ \text{r.}1$$

Pupils can move onto solving division problems with decimals using the bus stop method.

Pupils should then move onto solving TU ÷ U with remainders and then move onto HTU ÷ U using the same method and ThHTU without and then with remainders. Remainders should be expressed appropriately. E.g

$$4\overline{)\,5\ ^{1}4}\quad 1\ \ 3\ \text{r.}2$$

Once remainder is understood can move onto

$$4\overline{)\,5\ ^{1}4}\quad 1\ \ 3\ ^{2/4}$$

This can then be simplified to 13 ½

This can then be converted to a decimal to make 13.5

Then they can move onto solving HTU ÷ TU numbers without remainders and then with.

$$25\overline{)\cancel{3}^{3}5^{10}2}\quad 1\ 4\ \text{r.}2$$

Repeat this with ThHTU ÷ TU.

Pupils who are able to can move onto division with decimals, dividing whole numbers with numbers up to 2d.p. E.g. 15 ÷ 1.55 using the expanded bracket method in the same way.

Throughout year 6, pupils should be taught and expected to use the inverse for all 4 operations to check their work.

Key vocabulary for Year 6 pupils

Add – Plus – More – Put together – Total – More than – Addition – Sum

Take Away – Minus – Less – Distance between – Difference between – Less than - Subtract

Times– Groups of – Lots of - Multiply

Share – Divide - Equal

Resources to aid learning

Bead strings – Cuisenaire – Everyday objects – Number lines – Counting objects – Mathletics – Coins.