UNITY

SCHOOLS PARTNERSHIP

Calculation Policy 2021-22

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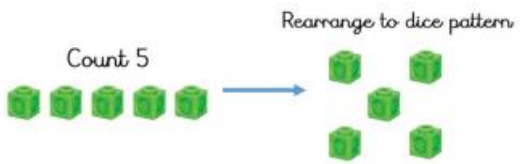
Contents

EYFS – Number Have a deep understanding of number to 10, including the composition of each number

Count objects, actions and sounds.

For 1:1 counting, number sounds are clearly separated and items counted with exaggerated movements. Counted objects are rearranged in regular patterns to support quantity recognition.



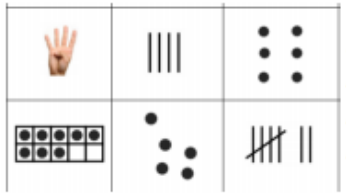
Children learn that each object is counted once and the last number is the total for the set — count small sets in irregular arrangements. Progress by counting out items from larger set; objects that can't be moved; make objects not visible once counted; count movements and sounds. Counting on taught by counting two sets, then screening one of the counted sets.

Children can count out a smaller number from a larger group: "Give me seven…" Knowing when to stop shows that children understand the cardinal principle. Build counting into everyday routines such as register time, tidying up, lining up or counting out pieces of fruit at snack time.

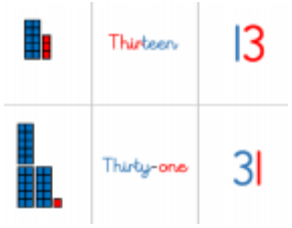
Link the number symbol (numeral) with its cardinal number value.

Children match numerals to different representations of number for quantities 1-10 (eg making and finding 5 in different ways)

Discuss the different ways children might record quantities (for example, scores in games), such as tallies, dots and using numeral cards.



Different representations matched to numerals



Understand 10 as a unit

Items are counted into groups of 10, for example pipe cleaners bundled into 10s or items counted into 10-frames. Children recognise quantities in multiple 10-frames as 'how many tens, how many ones'.

Count beyond ten

Count verbally beyond 20, pausing at each multiple of 10 to draw out the structure, for instance when playing hide and seek, or to time children getting ready.

Provide images such as number tracks, calendars and hundred squares indoors and out, including painted on the ground, so children become familiar with two-digit numbers and can start to spot patterns within them.

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

EYFS - Number

Subitise to 5

Children recognise quantities up to 5 without counting

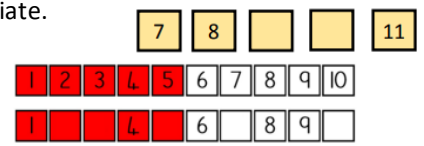
Show small quantities in familiar patterns (for example, dice) and random arrangements. Play games which involve quickly revealing and hiding numbers of objects. Put objects into five frames and then ten frames.

Image shown briefly. How many toys?

A range of representations used for quantities 1-10. Children show numbers in different ways on fingers; games used to improve finger discrimination. Quick recognition of regular and irregular dot patterns, with larger quantities visualised in two parts (e.g. see 5 as 3 and 2). Children are taught to recognise quantities on 10-frame and base-5 number track.

To recite forwards and backwards number word sequences

Forwards and backwards number word sequences supported using songs and rhymes. Children continue number sequences starting from different numbers with some prior words in appropriate range e.g. 3, 4, 5, 6… or 24, 23… The transition over 10s boundaries supported by visuals. Number tracks used, with numbers hidden to add challenge as appropriate.



Automatic recall of number bonds to 10 (including doubles)

Have a sustained focus on each number to 10. Make visual and practical displays in the classroom showing the different ways of making numbers to 10 so that children can refer to these. Spot and use opportunities for children to apply number bonds: "There are 6 of us but only 2 clipboards. How many more do we need?"

Composition of numbers to 10 Focus on composition of 2, 3, 4 and 5 before moving onto larger numbers Provide a range of visual models of numbers: for example, six as double three on dice, or the fingers on one hand and one more, or as four and two with ten frame images.

Compare quantities up to 10 in different contexts

Provide collections to compare, starting with a very different number of things. Include more small things and fewer large things, spread them out and bunch them up, to draw attention to the number not the size of things or the space they take up. Include groups where the number of items is the same. Use vocabulary: 'more than', 'less than', 'fewer', 'the same as', 'equal to'. Encourage children to use these words as well.

Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.

EYFS – Nursery (Addition)

To make comparisons between quantities.

Which group of sweets would you like? Why?

To use language such as 'more' and 'lots of'

Please may I have some more milk?

I have a lot of conkers.

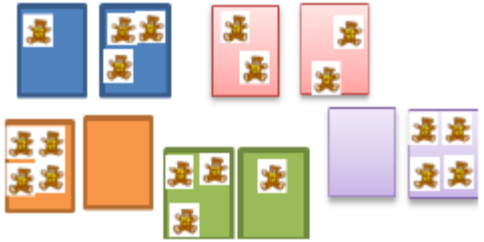
To use the language of 'more' to compare a set of objects.

Isaac has more blocks than me.

My blocks Isaac's blocks

To separate a set a group of up to 5 objects in different ways.

How many different ways can we put four teddies in two beds?



To respond to (and use) addition vocabulary in rhymes and games.

Elephant song

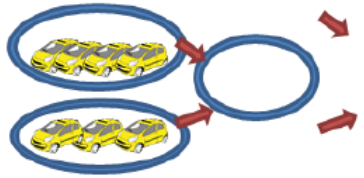
One elephant came out to play,
Upon a spider's web one day,
He found it such enormous fun,
That he called another elephant to come

Two elephants went out to play.... etc

Play

Can you put one more fish in the water tray? How many are there now?

To find the total number of objects in two groups by counting the all.



Three paper plates can be used to represent part, part whole. Children move the cars together into one group to find the total amount. (starting with 0-5)

To know when counting a group that the last number represents the amount.

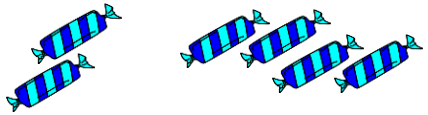
To find one more than a given amount.

EYFS – Nursery (Subtraction)

To make comparisons between quantities.

Which group of cars would you like to play with? Why?

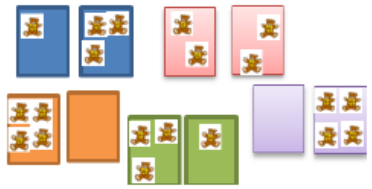
To use the language of fewer (less) to compare a set of objects.



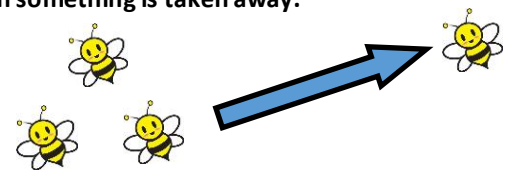
I have fewer sweets than Jenny.

To separate a group of up to 5 objects in different ways (total still the same)

How many different ways can we put four teddies in two beds?



To know that a group of objects changes amount when something is taken away.

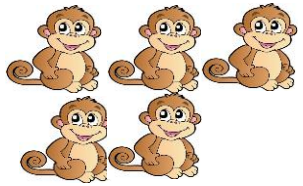


To respond to (and use) subtraction vocabulary in rhymes and games.

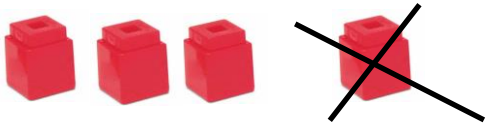
Five little ducks

Ten green bottles

5 Little Monkeys.

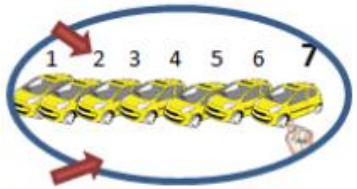


To find the total number of items after some are taken away by counting all of them.



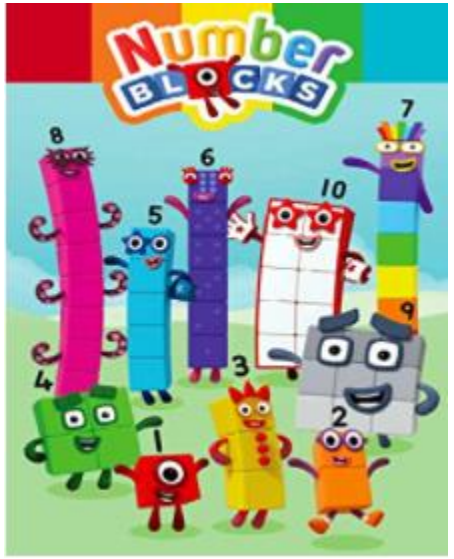
1, 2, 3

To know that when counting the last number represents the quantity.



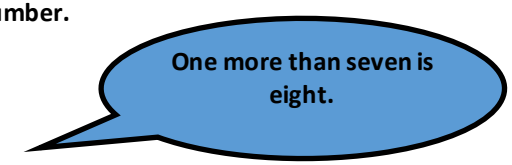
There are seven in the group.

Composition and decomposition of number

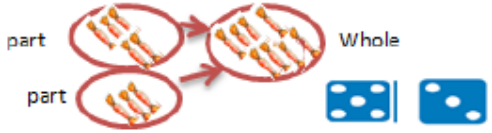


EYFS – Reception (Addition)

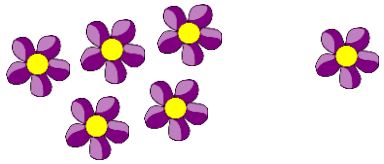
To say the number that is one more than a given number.



Combine two or more quantities to find the total (combining)

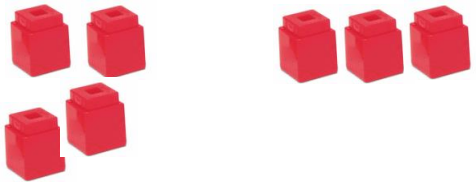


To find one more than a group of up to five, then ten objects.



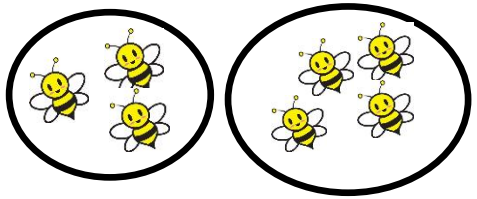
One more than five is six.

To count on when adding to a group (holding first number in head.

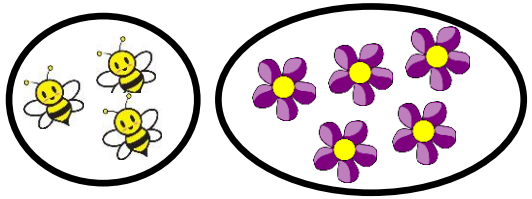


Four... **...five, six, seven**

To add two sets of objects that are the same.



To add two sets of objects that are different.



Increase one quantity by a given amount to find the total (argumentation)

Maria has five sweets and she is given 3 more.
How many does she have in total? (increase)

Records using marks they can interpret and explain.

To recognise and name + and = signs.

Add, more, plus, is equal to... altogether, total,

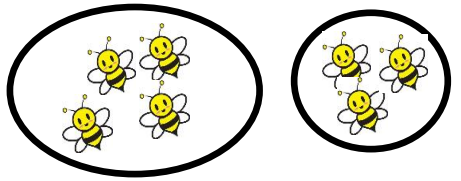
To read an addition number sentence

To read aloud $3 + 4 = 7$ knowing the correct vocabulary for the symbols + and =

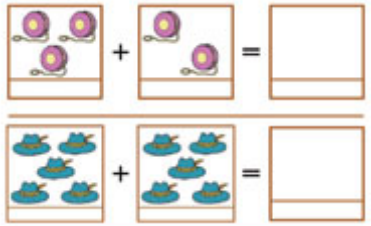
To solve an addition number calculation.

Using objects to solve.

$4 + 3 = 7$



To match number cards to objects to make number sentences.



To know double s to 10.

1 + 1 = 2	4 + 4 = 8
2 + 2 = 4	5 + 5 = 10
3 + 3 = 6	

EYFS – Reception (Addition)

To know number bonds of 5,6 and 10

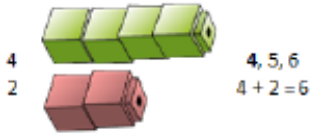
Part, part whole: number bonds to 5.

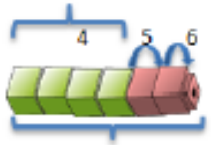
Progression towards bar model

Adding objects to a group .

What is two more than 4?

Children can then use cubes, counting on from the greater number, to find the total number of cubes.





EYFS – Reception (Subtraction)

Relates subtraction to taking away.

3 toy cars

Take away 2

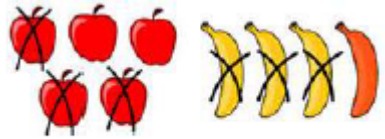
Leaves 1 toy car.

To find one less than a group of up to five, then ten objects.

I less than 6 is 5

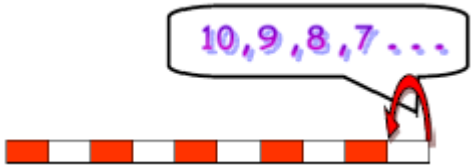
Recording using marks they can explain and apply meaning.

Using quantities and objects to subtract single-digit numbers and count on to find the answer.



5 – 3 = 2 4 – 3 = 1

To count backwards on a number line or counting stick.



To use composition and decomposition of numbers to 10 to support this

EYFS – Reception (Subtraction)

To recognise and name - and = symbols.

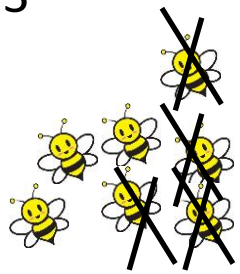
Subtract, take away, minus left, part, whole, is equal to.

To read a subtraction calculation.

To read aloud 7 - 4 = 3 knowing the correct vocabulary for the symbols - and =

To solve a subtraction calculation using objects.

7 - 4 = 3



To arrange a subtraction calculation.

7 - 3 = 4

To halve (an even group up to 12)

Half of 8 is 4.

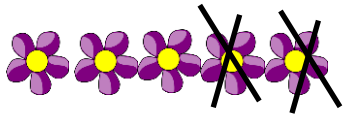
To know number bonds to 10

Part, part whole: number bonds to 5.

Begin to identify own mathematical problems based on own interests.

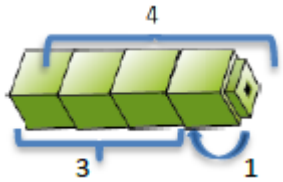
Progression towards bar model.

Chn to start by subtracting objects from a group.



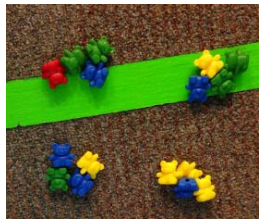
Chn using cubes, counting back from the greater number to find the total number of cubes.

4 -1 = 3

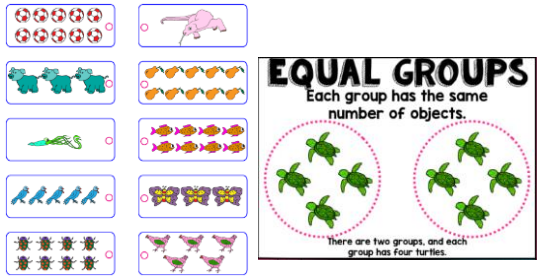


EYFS – Reception (Multiplication)

Children can lay out equal groups.



Can match equal groups.



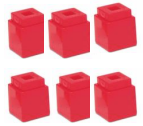
Recognise when they are given equal amounts.

Double objects

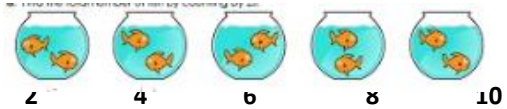
Double 1 is 2

To double quantities.

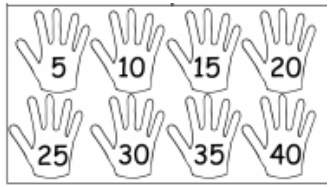
Double the cubes



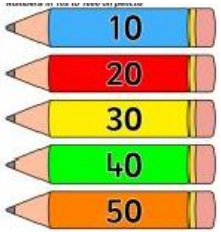
To step count in 2s



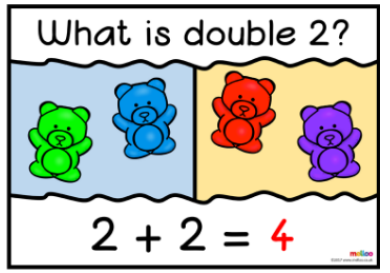
To step count in 5s



To step count in 10s



To begin to relate doubles as repeated addition.

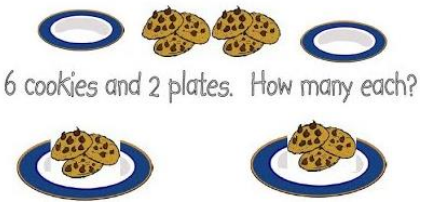


To recognise odd and even numbers.

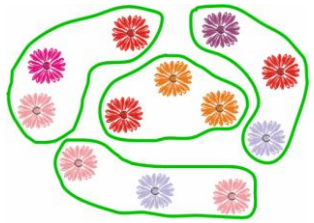
To count objects up to 20 in arrays.

EYFS – Reception (Division)

To share objects between two people equally

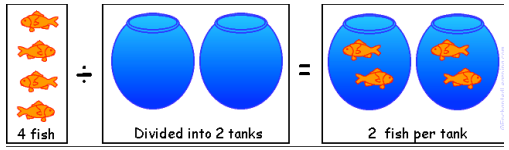


To group objects in to equal groups.



To halve equal numbers up to 10

To share an even group equally between 2.



To share an even group between 3 or 4.

To identify odd and even numbers

To count up to 20 in arrays.

To problem solve with grouping and sharing.

How should we put the seeds in these four pots?
Is there a way so that we'll have the same? Are there any left over?

Can we share out these sweets fairly? How shall we do it?
Between 2 people? What would happen if it was between 3 people?

Count out these stickers round the circle of children.
How many times will they go around? Are there any left over?

Addition
Year 1 to 6

Progression:

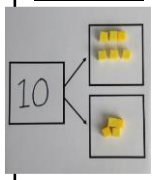
1. O + O where the answer is less than 10
2. O + O = 10
3. O + O crossing the tens boundary
4. O + O crossing 10 using number facts to bridge
5. teen numbers + O not crossing 20
6. teen numbers + O = 20
7. teen numbers + O crossing 20
8. TO + O (not crossing tens boundary)
9. TO + O (crossing tens boundary)
10. multiple of 10 + multiple of 10
11. O + O + O (not crossing tens)
12. O + O + O (regrouping)
13. TO + multiple of 10 (all)
14. TO + TO (not crossing tens)
15. TO + TO (crossing tens)
16. TO + TO (crossing hundreds)
17. TO + TO (crossing tens and hundreds)
18. HTO + TO (no carrying)
19. HTO + TO (one carry – first tens then hundreds)
20. HTO + HTO (one carry – first tens then hundreds)
21. TO + TO (two carries – tens and hundreds)
22. HTO + TO (two carries – tens and hundreds)
23. HTO + HTO (two carries – tens and hundreds) – into thousands
24. ThHTO + HTO
25. ThHTO + ThHTO
26. O.t + O.t (in the context of measures and money)
27. O.th + O.th (in the context of measures and money)
28. O.t + O.t
29. O.th + O.th
30. O + O.t
31. TO + O.th
32. Addition of numbers with any number of digits
33. Addition of two or more numbers with at least 4 digits and 3 decimal places
34. Addition of two or more numbers with at least 4 digits of various sizes and varied decimal places (e.g. 401.2 + 26.85 + 113)

NC | Vocab | **Year 1** | Resources

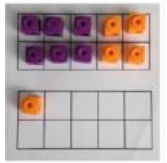
Progression:

1. O + O where the answer is less than 10
2. O + O = 10
3. O + O crossing the tens boundary
4. O + O crossing 10 using number facts to bridge
5. teen numbers + O not crossing 20
6. teen numbers + O = 20
7. teen numbers + O crossing 20
8. TO + O (not crossing tens boundary)
9. TO + O (crossing tens boundary)
10. multiple of 10 + 10 (not crossing hundreds boundary)
11. 1 more than any given number to 100
12. O + O + O (not crossing tens)
13. O + O + O (regrouping)

Concrete:



6 + 5 = 11



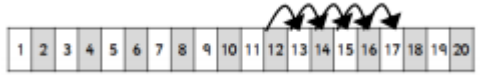
Start with the bigger number and use the smaller number to make 10.

Use ten frames.

Adding multiples of 1

Pictorial:

12 + 5 = 17



Bar models

Abstract:

4 + 6 = _____ 10 = ____ + 6 4 + _____ = 10

Examples of Mastery:

I know that 7 and 3 is 10. How can I find 8 + 3? How could you work it out?

Sarah had 12 marbles and Paul had 5 marbles. How many marbles did Paul and Sarah have altogether.

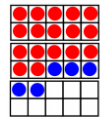
NC | Vocab | **Year 2** | Resources

Progression:

1. TO + O (not crossing tens)
2. TO + O (crossing tens)
3. multiple of 10 + multiple of 10
4. O + O + O (not crossing tens)
5. O + O + O (regrouping)
6. TO + multiple of 10 (all)
7. TO + TO (not crossing tens)
8. TO + TO (crossing tens)
9. TO + TO (crossing hundreds)
10. TO + TO (crossing tens and hundreds)

Concrete:

Adding TO + O using known facts, Place value counters and ten frames – show alongside pictorial representations



17 + 5 = 22

Use ten frame to make 'magic ten

Children explore the pattern.

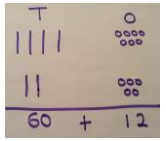
17 + 5 = 22

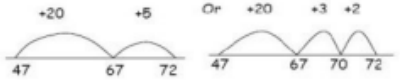
27 + 5 = 32

Using dienes to add TO + TO

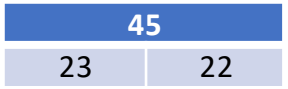
$$\begin{array}{r} 40 + 7 \\ +\ 20 + 5 \\ \hline 60 + 12 = 72 \end{array}$$

Pictorial:





Use number line and bridge ten using part whole if necessary.



Abstract:

47
25 +
12 (7 + 5)
60 (40 + 20)
72

Examples of Mastery:

If I have 15 blocks how many ways can I organise them?

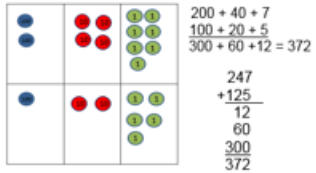
NC | Vocab | **Year 3** | Video | Resources

Progression:

1. HTO + TO (no carrying)
2. HTO + TO (one carry – first tens then hundreds)
3. HTO + HTO (one carry – first tens then hundreds)
4. TO + TO (two carries – tens and hundreds)
5. HTO + TO (two carries – tens and hundreds)
6. HTO + HTO (two carries – tens and hundreds) – into thousands

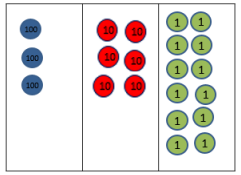
Concrete and Pictorial Representation

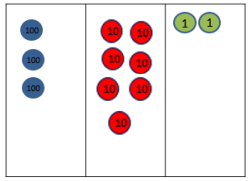
Make both numbers on a place value grid using place value counters. Pupils could also draw this as a pictorial representation. Dienes could also be used.



200 + 40 + 7
100 + 20 + 5
300 + 60 +12 = 372

247
+125
12
60
300
372





This scaffolds pupils understanding with exchanging.

Bar models

372	
247	125

Abstract

247
+ 125
12 (7 + 5)
60 (40 + 20)
300 (200 + 100)
372

leading to

247
+ 125
372
1

Examples of Mastery:

2 4 7
+1 2 5
3 6 2

Is this answer to this equation correct? Explain your answer

There are six 3-digit addition calculations shown below.

a) 124 + 233 = ____
b) 644 + 172 = ____
c) 366 + 277 = ____
d) 579 + 221 = ____
e) 791 + 163 = ____
f) 567 + 233 = ____

Which calculations have no carry digits?
Which calculations have a carrying digit only once?
Which calculations have a carrying digit twice?
Which calculation has the largest answer?
Which calculation has the smallest answer?

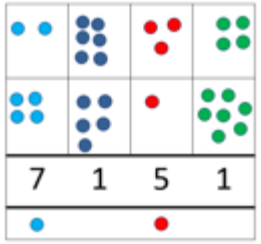
NC | Vocab | **Year 4** | Video | Resources

Progression:

1. ThHTO + HTO
2. ThHTO + ThHTO
3. O.t + O.t (in the context of measures and money)
4. O.th + O.th (in the context of measures and money)

Concrete and Pictorial Representation

As Year 3, continue to use place value counters and grids.
Extend to using decimal place value counters



2634
+4517
7151
1 1

Abstract:

Pupils should be encouraged to check their answers using inverse operation

7151
- 4517
2634

2634
+4517
7151
1 1

Examples of Mastery:

Week 1, Jo drove 3457 miles on Monday 5678 on Tuesday. Week 2, Jo drove 4567 miles on Monday and 2786 on Tuesday. Which week did Jo drive the most miles?

Fill in the empty boxes to make the equations correct.

7 ☐ 1 + ☐ 3 ☐ = 999

7 ☐ 1 + ☐ 3 ☐ = 1000

NC | Vocab | **Year 5** | Resources

Progression:

1. O.t + O.t
2. O.th + O.th
3. O + O.t
4. TO + O.th

Concrete and Pictorial Representation

As Year 4, continue to use place value counters and grids.
Extend to using decimal place value counters

Introduce decimal place value counters and model exchange for addition.

Abstract

Continue to develop the formal written method for addition with larger numbers (and decimal numbers) and with the addition of three or more numbers.

21848 + 1523 = 23371

```
 21848
+ 1523
 23371
  1 1
```

Use the formal written method for the addition of decimal numbers:

£154.75 + £233.82 = £388.57

```
 154·75
+ 233·82
 388·57
    1
```

Children extend their use of the compact column method to add numbers with at least four digits and decimals with careful consideration of missing place holders.

```
HTU.th
257.80
+492.55
750.35
1 1 1
```

Children may include zero place-holders to aid layout and understanding of place value.

Examples of Mastery:

When working with whole numbers, if you add 2 digit numbers together the answer cannot be a 4 digit number. Do you agree? Why?

NC | Vocab | **Year 6** | Resources

Progression:

1. Addition of numbers with any number of digits
2. Addition of two or more numbers with at least 4 digits and 3 decimal places
3. Addition of two or more numbers with at least 4 digits of various sizes and varied decimal places (e.g. 401.2 + 26.85 + 113)

Concrete and Pictorial Representation

As Year 5, continue to use place value counters and grids.
Continue to use decimal place value counters

Abstract:

```
  81,059
+  3,668
  15,301
  20,551
 -------
 120,579
 1 1  1 1
```

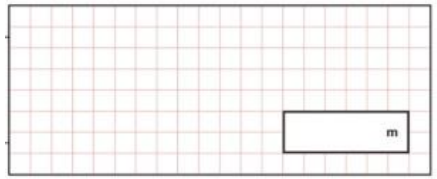
```
  23.361
+  9.080
  59.770
   1.300
 -------
  93.511
 -------
  2 1  2
```

Examples of Mastery:

This table shows the heights of three mountains.

Mountain	Height in metres
Mount Everest	8,848
Mount Kilimanjaro	5,895
Ben Nevis	1,344

How much higher is Mount Everest than the combined height of the other two mountains?



Can you use five of the digits 1 to 9 to make this number sentence true?

□ □ · □ + □ · □ = 31·7

Can you find other sets of five of the digits 1 to 9 that make the sentence true?

Subtraction
Year 1 to 6

Progression:

1. O - O (where answer is less than 10)
2. Subtracting from 10
3. teen number - O (where answer is 10 or more)
4. teens - O (going back over tens boundary)
5. Subtraction facts from 20
6. Subtracting 10 from multiple of 10
7. TO - O (not crossing tens)
8. TO - O (crossing tens)
9. TO - multiples of 10 = less than 100
10. TO - TO (not crossing tens)
11. TO - TO (crossing tens)
12. HTO - TO (no adjustments)
13. HTO - HTO (no adjustments)
14. Adjustment T to O
15. Adjustment H to T
16. HTO - TO (1 adjustments)
17. HTO - TO (2 adjustments)
18. HTO - HTO (2 adjustments)
19. HTO - HTO (extending to noughts in the ones)
20. ThHTO - ThHTO (extending to noughts in the ones)
21. O.t - O.t (in the context of measures and money)
22. O.th - O.th (in the context of measures and money)
23. TO.th - TO.th (in the context of measures and money)
24. O.t + O.t
25. O.th + O.th
26. TO.th - TO.th
27. Increasingly larger numbers and complex decimal values
28. Difference between 2 negative integers
29. Difference between positive and negative integers

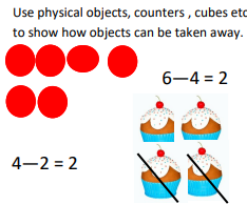
NC | Vocab | **Year 1** | Resources

Progression:

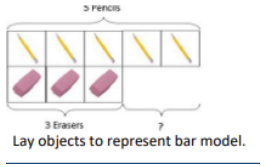
1. O - O (where answer is less than 10)
2. Subtracting from 10
3. teen number - O (where answer is 10 or more)
4. teens - O (going back over tens boundary)
5. Subtraction facts from 20
6. Subtracting 10 from multiple of 10

Concrete:

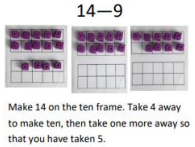
Use concrete objects, base 10, Numicon and tens frames to aid subtraction



Begin to make links with the bar model, using a pictorial representation alongside concrete objects.

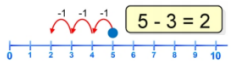


Use tens frames to work with numbers within ten and then extend to crossing the tens boundary.



Pictorial:

Images of pictures for pupils to cross out
Bar models, number lines and tens frames



Abstract:

10 - 6 = _____ 10 - ____ = 10 - ____ = ____ - 4 = 6

Examples of Mastery:

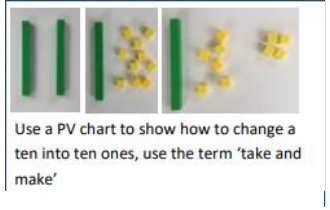
Create 4 number sentences using these 3 numbers; 2 5 7

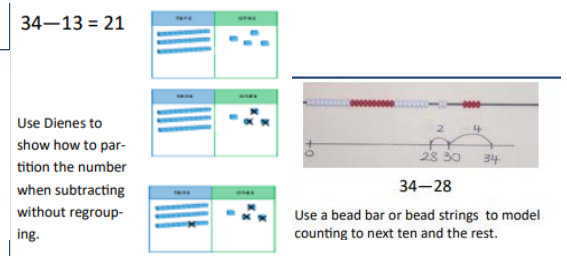
NC | Vocab | **Year 2** | Resources

Progression:

1. TO - O (not crossing tens)
2. TO - O (crossing tens)
3. TO - multiples of 10 = less than 100
4. TO - TO (not crossing tens)
5. TO - TO (crossing tens)

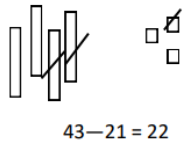
Concrete:

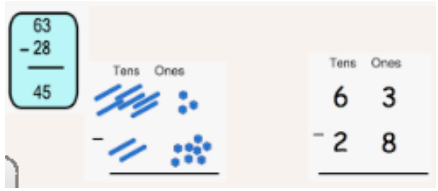




Pupils should be confident with exchanging tens into ten ones before being introduced to subtraction with crossing tens.

Pictorial:





Abstract:

85 − 21 = ☐

Examples of Mastery:

Look at the numbers in this addition.

9 + 5 = 14

Use the **same numbers** to make these correct.

☐ − ☐ = 9

☐ − 9 = ☐

12 children are on a bus.
8 children get **off** the bus.
Then **4** more children get **off** the bus.
Tick (✓) the number of children left on the bus.

8 2 0

NC | Vocab | **Year 3** | | Resources

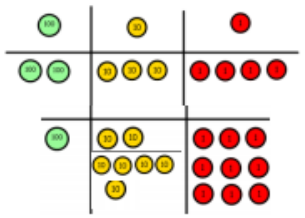
Progression:

1. HTO - TO (no adjustments)
2. HTO - HTO (no adjustments)
3. Adjustment T to O
4. Adjustment H to T
5. HTO - TO (1 adjustments)
6. HTO - TO (2 adjustments)
7. HTO - HTO (2 adjustments)

Concrete and Pictorial Representation

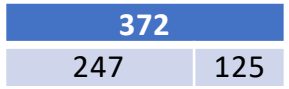
Make both numbers on a place value grid using place value counters. Pupils could also draw this as a pictorial representation. Dienes could also be used.

234 - 179



This scaffolds pupils understanding with exchanging.

Bar models



Abstract

$$\begin{array}{r} {\scriptstyle 1\ \ 15} \\ 2\not{5}\ 8 \\ -\ \ 7\ 3 \\ \hline 1\ 7\ 5 \end{array}$$

Examples of Mastery:

Flo and Jim are answering a problem:

Danny has read 62 pages of the class book, Jack has read 43. How many more pages has Danny read than Jack?

Flo does the calculation 62 + 43. Jim does the calculation 62–43.

Who is correct?

Explain how you know.

Pupils might demonstrate using a bar model to explain their reasoning.

NC | Vocab | **Year 4** | | Resources

Progression:

1. HTO - HTO (extending to noughts in the ones)
2. ThHTO - ThHTO (extending to noughts in the ones)
3. O.t - O.t (in the context of measures and money)
4. O.th - O.th (in the context of measures and money)
5. TO.th - TO.th (in the context of measures and money)

Concrete and Pictorial Representation

As Year 3, continue to use place value counters and grids.
Extend to using decimal place value counters

Continue to use bar models to demonstrate subtraction.

Abstract:

3625 – 1219

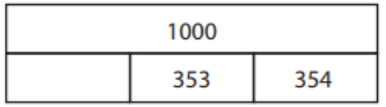
$$\begin{array}{r} {\scriptstyle 1\ \ 15} \\ 3\,6\,2\not{5} \\ -\ 1\,2\,1\,9 \\ \hline 2\,4\,0\,6 \end{array}$$

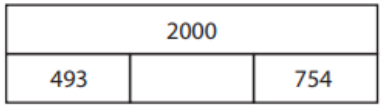
£7.93 - £4.86

$$\begin{array}{r} \text{U . t h} \\ {\scriptstyle 8\ \ 13} \\ £7.\not{9}\not{3} \\ -\ £4.8\,6 \\ \hline £3.0\,7 \end{array}$$

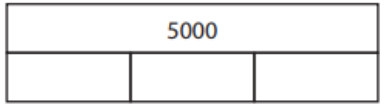
Examples of Mastery:

Identify the missing numbers in these bar models. They are not drawn to scale.





Select your own numbers to make this bar model correct.



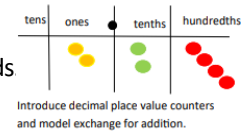
NC | Vocab | **Year 5** | Resources

Progression:

1. O.t + O.t
2. O.th + O.th
3. TO.th - TO.th

Concrete and Pictorial Representation

As Year 4, continue to use place value counters and grids
Extend to using decimal place value counters



Introduce decimal place value counters and model exchange for addition.

Abstract

Continue to develop the formal written method for subtraction with three and four digit numbers (see Y4 guidance), returning to an expanded method and using base ten materials, if necessary.

When children are confident extend with larger numbers (and decimal numbers). Return to an expanded method, if necessary.

£154.75 + £233.82 = £388.57

```
  154·75
+ 233·82
  388·57
    1
```

Introduce subtraction of decimals, initially in the context of money and measures.

```
HTU.th
257.80
+492.55
750.35
111
```

Children may include zero place-holders to aid layout and understanding of place value.

Examples of Mastery:

True or False?

- 3999 – 2999 = 4000 – 3000
- 3999 – 2999 = 3000 – 2000
- 2741 – 1263 = 2742 – 1264
- 2741 + 1263 = 2742 + 1264
- 2741 – 1263 = 2731 – 1253
- 2741 – 1263 = 2742 – 1252

Explain your reasoning.

Using this number statement, 5222 – 3111 = 5223 – 3112 write three more pairs of equivalent calculations.

Pupils should not calculate the answer to these questions but should look at the structure and relationships between the numbers.

NC | Vocab | **Year 6** | Resources

Progression:

1. Refine year 5, increasingly larger numbers and complex decimal values
2. Difference between 2 negative integers
3. Difference between positive and negative integers

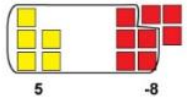
Concrete and Pictorial Representation

As Year 5, continue to use place value counters and grids.
Continue to use decimal place value counters

Use algebra tiles to calculate the difference between positive and negative integers

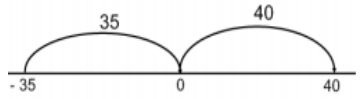
Add: 5 + (-8).

Solution
Use Algebra Tiles to combine. Remove zero pairs. Each pair consisting of a yellow tile and a red tile can be removed.



Use an empty number line to show differences between negative numbers, and positive and negative numbers.

What is the difference between 40 and -35?



35 + 40 = 75

Abstract:

```
 0 9 1   3 1
 1 10 5 . 4 1 9
-  3 6 . 0 8 0
   6 9 . 3 3 9
```

Examples of Mastery:

Write different number sentences using the digits 2, 3, 5 and 8 before the equals sign, using:

- one operation
- two operations but no brackets
- two operations and brackets.

Multiplication
Year 1 to 6

Progression:

1. Concrete objects and pictorial representations
2. Arrays
3. Repeated addition
    1. Practical apparatus
    2. Number lines
    3. Bar models
4. Number partitioning
    1. Dienes / Base 10
    2. Using known facts (e.g. 27 x 3 = (20 x 3) + (7 x 3))
5. Compact method TO x O and HTO x O
6. Multiplying decimals through repeated addition and known facts
    1. Practical apparatus (Place value counters)
    2. Number lines
    3. Bar models
7. Compact method TO x TO and HTO x TO and beyond

NC | Vocab | **Year 1** | | Resources

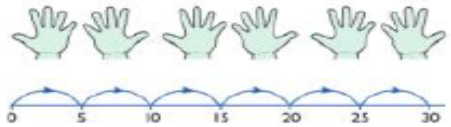
Progression:

1. Use repeated addition of equal groups using apparatus
2. Use repeated addition of equal groups using pictorial representations
3. Multiples of 2
4. Multiples of 5
5. Multiples of 10
6. Investigate patterns when counting in 2s, 5s and 10s.

Concrete:

Repeated addition and equal groups.

Pictorial:



Abstract:

Count in multiples of a number aloud.

Write sequences with multiples of numbers. Include missing numbers in the seque

2, 4, 6, 8, 10

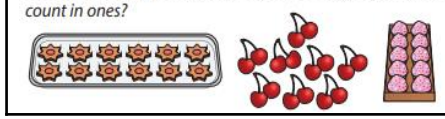
5, 10, 15, 20, 25 , 30

Examples of Mastery:

Ben had 5 football stickers. His friend Tom gave him 5 more, how many does he have altogether?

'How many cherries are there altogether?'

Observe how pupils count the objects. Do they count in twos, fives etc. or do they count in ones?

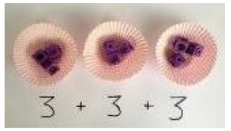


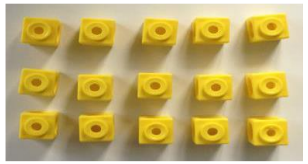
NC | Vocab | **Year 2** | | Resources

Progression:

1. Multiplication as equal groups – *building on Y1*
2. 2 × table
3. 5 × table
4. 10 × table
5. Multiplying by 2, 5 and 10
6. Word problems

Concrete:

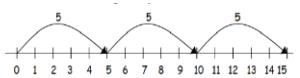




Using an array 5 X 3 =

Pictorial:

Use of arrays to show commutativity.



15		
5	5	5

5 + 5 + 5 = 15

Abstract:

5 + 5 + 5 = 15

3 + 3 + 3 + 3 + 3 = 15

5 x 3 = 15

3 x 5 = 15

Examples of Mastery:

Anna has 3 boxes of cakes. Each box contains 5 cakes. How many cakes does she have altogether? Show how you worked this out

True or false?

5 × 4 = 4 × 5

5 × 4 = 10 × 2

5 × 4 = 2 × 10

Explain your reasoning.

What do you notice?

Which has the most biscuits:

4 packets of biscuits with 5 in each packet, or

3 packets of biscuits with 10 in each packet?

Explain your reasoning.

NC | Vocab | **Year 3** | | Resources

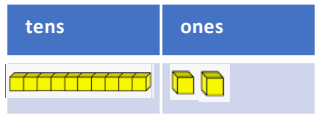
Progression:

1. 3× tables
2. 4× tables
3. 8× tables
4. Multiplying by 3, 4 and 8
5. Word problems
6. Multiples of 10 x ones
7. TO × O using base 10
8. TO × O expanded x column (no regrouping)
9. TO × O expanded x column (regrouping)
10. TO × O condensed recording

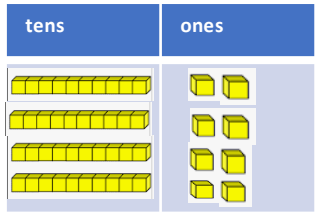
Concrete:

Multiple each piece using known tables.

12 x 4

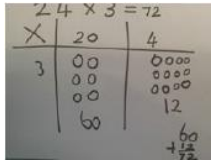


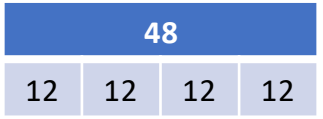
Multiply the tens and ones by 4



40 + 8 = 48

Pictorial:





Abstract

27 X 3

20 X 3 = 60

7 X 3 = 21

60+21 = 81

27

3 x

21

60 +

81

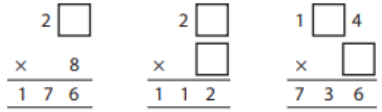
3 | 20 | 7

60	21
81	

Examples of Mastery:

Circle three numbers that add to make a multiple of 4: 11 12 13 14 15 16 17 18 19

Find the missing digits.

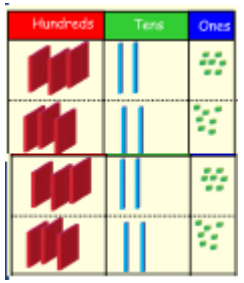


NC | Vocab | **Year 4** | | Resources

Progression:

1. 6× tables
2. 7× tables
3. 9× tables
4. Multiplying by 0
5. HTO × O (no regrouping)
6. HTO × O (regrouping)

Concrete and pictorial



These can be drawn out for a pictorial representation.

Abstract

327

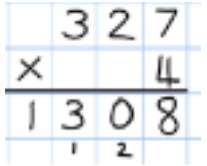
4

X 28 (4 x 7)

80 (4 x 20)

1200 (4 x 300)

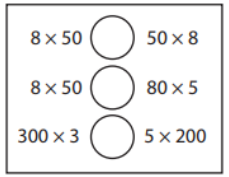
1308



Examples of Mastery:

Place one of these symbols in the circle to make the number sentence correct: >, < or =.

Explain your reasoning.



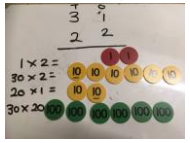
NC | Vocab | **Year 5** | Resources

Progression:

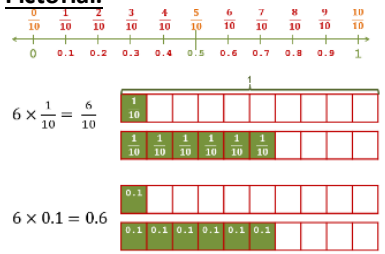
1. Multiply whole numbers (including TO) by 10, 100 and 1 000
2. Multiply decimals by O
3. TO × TO using long multiplication

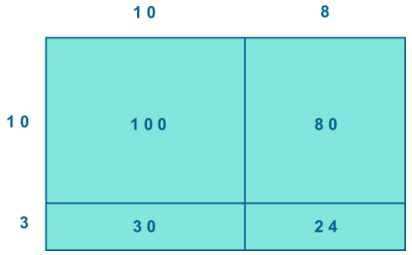
Concrete:

As Year 4, extending to using Place value counters to multiply tenths by O e.g. 0.6 x 3



Pictorial:





Abstract:

13
18 x
24 (8 x 3)
80 (8 x 10)
30 (10 x 3)
100 (10 x 10)
234

Examples of Mastery:

A 50 cm length of wood is cut into 4 cm pieces.

How many 4 cm pieces are cut and how much wood is left over?

Fill in the blanks to represent the problem as division:

☐ ÷ ☐ = ☐ remainder ☐

Fill in the blanks to represent the problem as multiplication:

☐ × ☐ + ☐ = 50

NC | Vocab | **Year 6** | Resources

Progression:

1. Whole numbers × O using short multiplication
2. TO × TO using long multiplication
3. HTO × TO using long multiplication

Concrete:

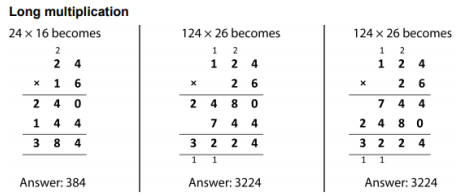
As Years 4 and 5, continuing to use Place value counters (including decimals)

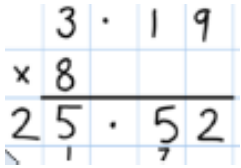
Pictorial:

Continue to use the bar model, where applicable.

Use pictorial representations of Place value counters, where applicable.

Abstract:





Examples of Mastery:

Find numbers to complete these number sentences.

736 ÷ 23 = ☐	☐ × 100 = 2400	☐ × 100 = 10 × ☐
7360 ÷ 230 = ☐	25 × ☐ = 200	25 × ☐ = 4 × ☐
230 × 24 = ☐	23 × ☐ = 161	23 × ☐ = 161 × ☐
240 × 23 = ☐	24 × ☐ = 168	24 × ☐ = 168 × ☐
1668 ÷ 8 = ☐	161 ÷ ☐ = 23	161 ÷ ☐ = 23 × ☐
208·5 × 8 = ☐	☐ ÷ 25 = 9	☐ ÷ 25 = 9 × ☐

It is correct that 273 × 32 = 8736. Use this fact to work out:

- 27·3 × 3·2
- 2·73 × 32 000
- 873·6 ÷ 0·32
- 87·36 ÷ 27·3
- 8736 ÷ 16
- 4368 ÷ 1·6

Division
Year 1 to 6

Progression:

1. Division as sharing
2. Division as grouping
3. Arrays
4. Known facts (times tables)
5. Division with remainders
    1. Practical apparatus (Place value counters)
    2. Arrays
    3. Bar models
6. Short division TO ÷ O
    1. Practical apparatus (Place value counters)
    2. Bar models
7. Short division HTO ÷ O and beyond
8. Placing the quotient e.g. 207 ÷ 3
9. Noughts in the quotient (final digit, final digit is nought and then remainder, middle digit is nought) e.g. 6630 ÷ 3, 9992 ÷3, 6321 ÷ 3
10. Dividing with decimals using known facts (e.g. 4.2 ÷ 6)
11. Long division
12. Rounding up or down depending on context
13. Converting remainders to fractions

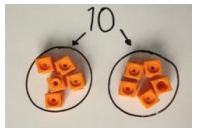
NC | Vocab | **Year 1** | Resources

Progression (Non statutory)

1. Division as sharing
2. Division as grouping - grouping a known quantity of pictorial representations
3. Using arrays to support concrete methods
4. Using multiples of 2,5,10 (alongside multiplication)

Concrete:



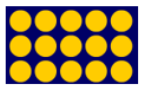
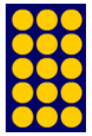


I have 10 cubes, can you share them equally in 2 groups?

Pictorial:

Children use pictures or shapes to share quantities.


8 ÷ 2 = 4

Use of arrays as a pictorial representation for division.
15 ÷ 3 = 5 There are 5 groups of 3.
15 ÷ 5 = 3 There are 3 groups of 5.

Abstract:

Share 4 buns between two people.

4 ÷ 2 = 2

Examples of Mastery:

I can see 10 wheels. How many bicycles?

How else could 20 sweets be put into bags so that every bag had the same number of sweets? How many bags would be packed each time?

Anna has **50** pencils.

She puts **5** pencils in each party bag.

How many bags does she put pencils in?

bags

True or False? If I share 10 apples, between 5 pupils, they will get 5 apples each.

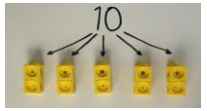
NC | Vocab | **Year 2** | Resources

Progression:

1. Sharing apparatus into equal groups– *building on Y1*
2. Grouping a known quantity of pictorial representations – *building on Y1*
3. Introducing ÷ sign, writing number sentence
4. Dividing by 2, 5, 10
5. Word problems
6. Begin to link multiplication and division fact- inverse

Concrete:

Divide quantities into equal groups.
Use cubes, counters, objects or Place value counters to aid understanding.

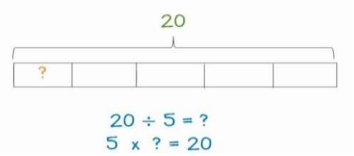


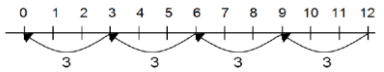
Bead strings used alongside number lines

Link division to multiplication by creating an array and thinking about the number sentences that can be created.

e.g 15 ÷ 3 = 5 5 x 3 = 15
15 ÷ 5 = 3 3 x 5 = 15

Pictorial:





Abstract:

15 ÷ 5 = 3

Divide 15 into 5 groups. How many are in each group?

Examples of Mastery:

Two friends want to buy some marbles and then share them out equally between them.

They could buy a bag of 13 marbles, a bag of 14 marbles or a bag of 19 marbles.

What size bag should they buy so that they can share them equally?

What other numbers of marbles could be shared equally?

Explain your reasoning.

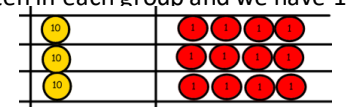
NC | Vocab | **Year 3** | | Resources

Progression

1. Dividing by 3, 4 and 8 (follow the below routine for each)
2. TO ÷ O (using pictorial images- no remainder, no carrying) e.g. 69 ÷ 3
3. TO ÷ O (using Place value counters - no remainder, carrying) e.g. 72 ÷ 3
4. TO ÷ O (using Place value counters - remainder, carrying) e.g. 47 ÷ 3
5. TO ÷ O (written method – following steps above)

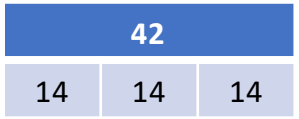
Concrete:

Use Place value counters to divide using the bus stop method alongside
42 ÷ 3=
Start with the biggest Place value, we are sharing 40 into three groups. We can put 1 ten in each group and we have 1 ten left over.



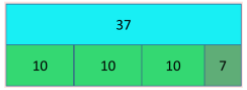
We exchange this ten for ten ones and then share the ones equally among the groups. How many in each group?

Pictorial:

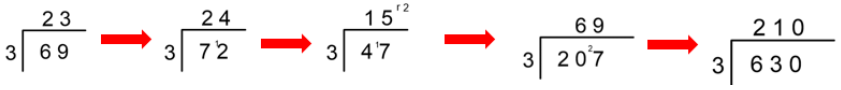


Draw dots and group them to divide an amount and clearly show a remainder.

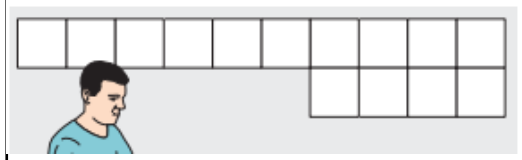
Use bar models to show division with remainders.



Abstract:



Examples of Mastery:



Roger is laying tiles.
He has 84 tiles altogether.
How many complete rows of tiles can he make?

NC | Vocab | **Year 4** | | Resources

Progression:

1. Dividing by 3, 4, 8, 6, 7, 8- continuing from year 3 and following on with tables knowledge (follow the below routine for each)
2. Known facts for multiples of 10 ÷ O (e.g. 60 ÷ 3, 80 ÷ 4)
3. HTO ÷ O (using pictorial images- no remainder, no carrying) e.g. 396 ÷ 3
4. HTO ÷ O (using base ten- no remainder, no carrying) e.g. 484 ÷ 4
5. HTO ÷ O (using base ten- no remainder, carrying) e.g. 452 ÷ 4
6. HTO ÷ O (using base ten- remainder, carrying) e.g. 494 ÷ 4
7. HTO ÷ O (written method – following steps above)
8. Noughts in the quotient (final digit, final digit is nought and then remainder, middle digit is nought) e.g. 630 ÷ 3, 92 ÷3, 321 ÷ 3

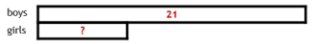
Concrete:

Use Place value counters to divide using the bus stop method alongside
369 ÷ 3=
Share 300 between 3 groups.; Share 60 between 3 groups; Share 9 between 3 groups
How many in each group?

Carrying
126 ÷ 3=
Start with the biggest Place value, we are sharing our hundreds (100) between three groups. We cannot do this so we exchange for ten tens. Now we have 12 tens. Now share 12 tens between 3 groups
Share 6 between 3 groups

Solving word problems

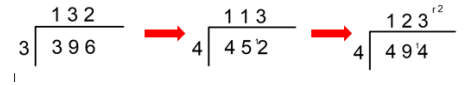
There are 21 boys in a class.
There are 3 times as many boys as girls in the class.
How many girls are there in the class?



Pictorial:

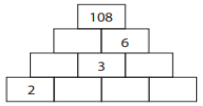
As Year 3, use bar models to show division, including remainders.

Abstract:

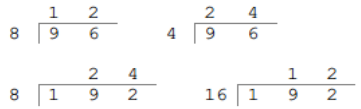


Examples of Mastery:

Fill in the missing numbers in this multiplication pyramid.



Look at the relationships between the questions below.



NC | Vocab | **Year 5** | Resources

Progression

1. Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000 (also in mental)
2. ThHTO ÷ O (written method- no remainder, no carrying) e.g. 6396 ÷ 3
3. ThHTO ÷ O (written method- no remainder, carrying) e.g. 7875 ÷ 7
4. ThHTO ÷ O (written method- remainder, carrying) e.g. 9462 ÷ 8
5. Placing the quotient e.g. 207 ÷ 3
6. Noughts in the quotient (final digit, final digit is nought and then remainder, middle digit is nought) e.g. 6630 ÷ 3, 9992 ÷3, 6321 ÷ 3

Concrete:

Use Place value counters to divide using the bus stop method alongside (no carrying)

6396 ÷ 3

Share 6000 between 3 groups; Share 300 between 3 groups; Share 90 between 3 groups; Share 6 between 3 groups

How many in each group? What is the total?

Carrying

1869 ÷ 3=

Start with the biggest Place value, we are sharing our thousands between three groups. We cannot do this so we exchange for ten hundreds. Now we have 18 hundreds. Now share 18 tens between 3 groups.

Extend with dividends that will yield 0 as a place holder in the quotient (e.g. 1824 ÷ 3 = 608)

Pictorial:

As Years 3 and 4, use bar models to show division, including remainders.

Abstract:

$$3\overline{)6396} = 2132 \qquad 7\overline{)7875} = 1125 \qquad 8\overline{)9462} = 1182\ r6 \qquad 3\overline{)3207} = 1069$$

Examples of Mastery:

A 1 m piece of ribbon is cut into equal pieces and a piece measuring 4 cm remains.

What might the lengths of the equal parts be?

In how many different ways can the ribbon be cut into equal pieces?

$$7\overline{)\square 2549} = 1178\ r\square$$

NC | Vocab | **Year 6** | Resources

Progression:

1. ThHTO ÷ TO (written method- no remainder, no carrying) e.g. 2436 ÷ 12
2. ThHTO ÷ TO (written method- no remainder, carrying) e.g. 3198 ÷ 26
3. ThHTO ÷ TO (written method- remainder, carrying) e.g. 9427 ÷ 23
4. Interpreting remainders as fractions (or rounding if appropriate)
5. Missing box problems
6. Dividing numbers with up to two decimal places

Concrete:

As Year 5 but extend with decimal Place value counters.

e.g. 1242 ÷ 4

Share 1000 between 4 groups; cannot be done so we exchange for 10 hundreds. We now have 12 hundreds which can be shared between 4 groups.

4 tens can be shared between four groups but 2 ones cannot. We exchange for 20 tenths. Now we can share this between 4 groups – we have 5 tenths.

Pictorial:

As Years 3 and 4, use bar models to show division, including remainders and decimals.

Abstract:

Long division:

$$13\overline{)2357} = 181\ r4$$

13 goes into 23 once, 1 × 13 = 13, 23 − 13 = 10

Bring down the 5 to make 105

13 goes into 105 eight times, 8 × 13 = 104, 105 − 104 = 1

Bring down the 7 to make 17

13 goes into 17 once, 1 × 13 = 13, 17 − 13 = 4 → (remainder)

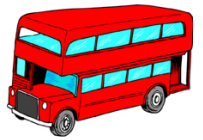
Converting remainders to fractions:

$$15\overline{)7580} = 505\ r5 \rightarrow \frac{5}{15} \rightarrow \frac{1}{3}$$

Examples of Mastery:

BUS PROBLEM

There were 3 times as many girls as boys on a bus.
There were twice as many children as adults.
There were 36 persons on the bus.
How many girls were there on the bus?



Bus	36 people		
Ratio chdn/adults	Children	Children	Adults
Ratio chdn	G G	G	B

Calculating with fractions Year 1 to 6

Progression:

1. Recognise, find and name a half as one of two equal parts of an object, shape or quantity
2. Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity
3. Recognise, find, name and write fractions ⅓, ¼, $^{2}/_{4}$ and ¾ of a length, shape, set of objects or quantity
4. Write simple fractions e.g. ½ of 6 = 3 and recognise the equivalence of two quarters and one half
5. Add and subtract fractions with the same denominator within one whole [for example, $^{5}/_{7} + {}^{1}/_{7} = {}^{6}/_{7}$]
6. Solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number
7. Add and subtract fractions with the same denominator
8. Add and subtract fractions with the same denominator and denominators that are multiples of the same number
9. Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagram.
10. Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions
11. Multiply simple pairs of proper fractions, writing the answer in its simplest form [for example, ¼ × ½ = $^{1}/_{8}$]
12. Divide proper fractions by whole numbers [for example, $^{1}/_{3} \div 2 = {}^{1}/_{6}$]

NC | Vocab | **Year 1** | Resources

Progression:

1. recognise, find and name a half as one of two equal parts of an object, shape or quantity
2. recognise, find and name a quarter as one of four equal parts of an object, shape or quantity

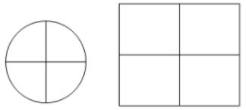
Concrete:

Here is a set of 12 pencils

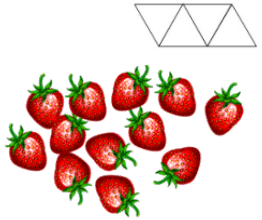
How many is half the set?

Finding half or a quarter of countable objects or shapes

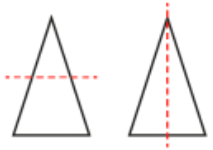
Pictorial:



Colour one quarter of each shape



Use models and images to exemplify sharing into equal groups.



Use examples and non-examples

Examples of Mastery:

What is half of this amount?

What fraction of the shape is shaded? Explain your reasoning.

NC | Vocab | **Year 2** | Resources

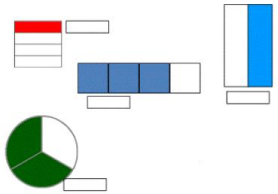
Progression:

1. Recognise, find, name and write fractions ⅓, ¼, ²⁄₄ and ¾ of a length, shape, set of objects or quantity
2. Write simple fractions e.g. ½ of 6 = 3 and recognise the equivalence of two quarters and one half

Concrete:

Building equivalence with Cuisenaire rods

Pictorial:



What is a third of 15?

15		
5	5	5

Abstract:

Half of 12 is ☐

$\frac{2}{4}$ of 12 is ☐

$\frac{1}{4}$ of 20 =

$\frac{3}{4}$ of 20 =

Examples of Mastery:

Half of ☐ is 6

$\frac{2}{4}$ of ☐ is 6

$\frac{1}{4}$ of ☐ = 5

$\frac{3}{4}$ of ☐ = 15

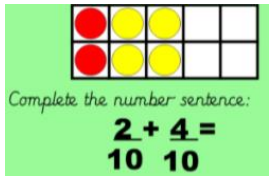
What fraction of the whole shape is red? Explain your reasoning.

NC | Vocab | **Year 3** | Resources

Progression:

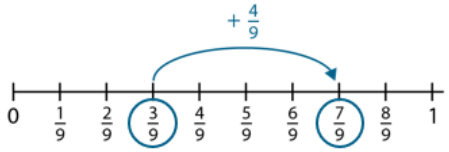
1. Add and subtract fractions with the same denominator within one whole [for example, $\frac{5}{7} + \frac{1}{7} = \frac{6}{7}$]

Concrete:



Use Cuisenaire rods, Numicon and double-sided counters to build addition and subtraction calculations

Pictorial: $\frac{3}{9} + \frac{4}{9} = \frac{7}{9}$



Use bar models , and number lines to represent addition and subtraction of fractions with the same denominator within 1

Abtstract:

'$\frac{6}{10}$ *is six lots of* $\frac{1}{10}$.'

'$\frac{2}{10}$ *is two lots of* $\frac{1}{10}$.'

'I know that $6 + 2 = 8$.'

'…so, I know that $\frac{6}{10} + \frac{2}{10} = \frac{8}{10}$.'

Verbal reasoning leading to the equation $\frac{6}{10} + \frac{2}{10} = \frac{8}{10}$

Examples of Mastery:

Fill in the numerators to make the calculation correct.
How many ways can you do it?

Explain how you know you have found them all.

$\frac{\quad}{8} + \frac{\quad}{8} = 1$

NC | Vocab | **Year 4** | Resources

Progression:

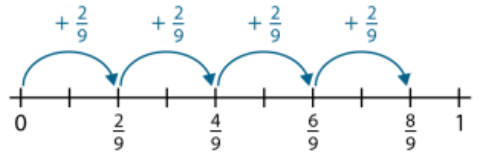
1. Solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number
2. Add and subtract fractions with the same denominator

Concrete:

Use Numicon, Cuisenaire rods and fraction blocks to build calculations with fractions, including multiplication through repeated addition.

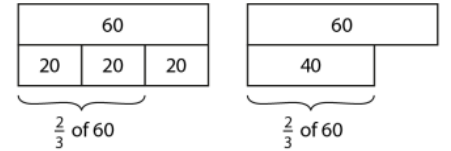
Pictorial:

$4 \times \frac{2}{9}$



Structure of repeated addition

$\frac{2}{3} \times 60$ (or $60 \times \frac{2}{3}$)



Structure of scaling

Abstract:

$\frac{2}{9} + \frac{2}{9} + \frac{2}{9} + \frac{2}{9} = \frac{8}{9}$

$4 \times \frac{2}{9} = \frac{8}{9}$

$\frac{2}{9} \times 4 = \frac{8}{9}$

$3\frac{1}{5} \times 4$

$\times 4$ $\times 4$

12 $\frac{4}{5}$ $= 12\frac{4}{5}$

Examples of Mastery:

'How many ways can you complete this equation?'

$\frac{24}{25} = \square \times \frac{\square}{25}$

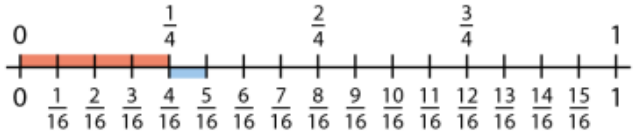
NC | Vocab | **Year 5** | | Resources

Progression:

1. Add and subtract fractions with the same denominator and denominators that are multiples of the same number
2. Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagram.

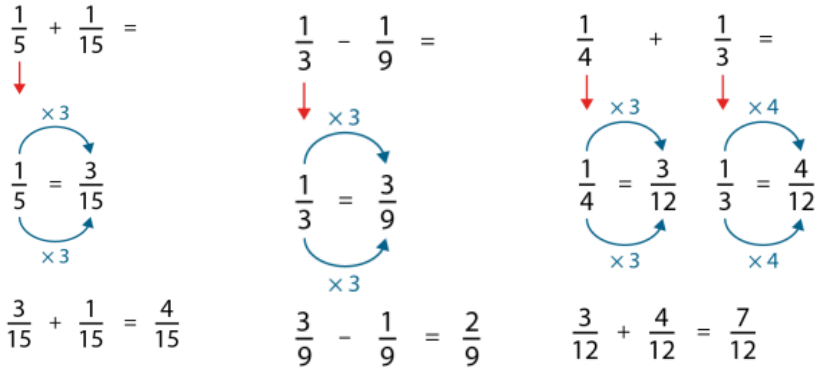
Concrete: Cuisenaire rods can be used to develop understanding of equivalence.

Pictorial:



Develop children's understanding of equivalence and common denominators through number lines and bar models.

Abtstract:



Examples of Mastery:

- *'How could you solve this calculation without using fifty-fourths as a common denominator?'*

$\frac{1}{6}+\frac{1}{9}$

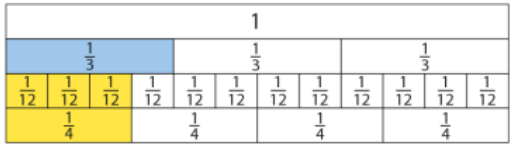
NC | Vocab | **Year 6** | | Resources

Progression:

1. Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions
2. Multiply simple pairs of proper fractions, writing the answer in its simplest form [for example, ¼ × ½ = $^1/_8$]
3. Divide proper fractions by whole numbers [for example, $^1/_3 \div 2 = {}^1/_6$]

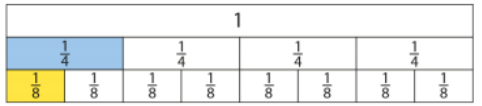
Concrete: Build calculations with Cuisenaire rods to develop understanding.

Pictorial:



$\frac{3}{4}\times\frac{1}{3}=\frac{3}{12}=\frac{1}{4}$

When dividing a fraction by a whole number, it makes it smaller. To divide a fraction by a whole number, convert it to an equivalent multiplication.



$\frac{1}{4}\times\frac{1}{2}=\frac{1}{4}\div 2$

A more efficient method of dividing a fraction by a whole number can be used when the fraction is a factor of the numerator

$\frac{6}{7}\div 3$

Abstract:

$\frac{4}{5}\times\frac{2}{3}=\frac{8}{15}$ $\frac{2}{3}\times\frac{4}{5}=\frac{8}{15}$

$\frac{3}{4}\times\frac{1}{3}=\frac{\cancel{3}^{1}}{\cancel{12}_{4}}=\frac{1}{4}$

$\frac{1}{3}\div 4=\frac{1}{12}$

$\frac{1}{3}\times\frac{1}{4}=\frac{1}{12}$

$\frac{6}{8}\div 2=\frac{3}{8}$

Examples of Mastery:

'How many solutions can you find to make the statement true?'

$\frac{\square}{\square}\times\frac{\square}{\square}\times\frac{\square}{\square}=\frac{3}{20}$

True or false?
The sum of two fractions is always greater than the product?
If I divide a fraction by a whole number, the quotient is always smaller than the dividend? Explain your reasoning.

Year 1 Resources

- Numicon
- Cubes
- Bead strings
- Rekenreks
- Part whole models
- Ten frames & double sided counters
- Multilink

- Coins
- Part whole models
- Shapes
- Fraction puzzles
- Countable concrete objects

(shells, acorns, buttons, pebbles etc)

- Cuisenaire rods
- Number tracks

NCETM spine materials
(addition& subtraction)

NCETM spine materials
(multiplication & division)

NCETM spine materials
(fractions)

Year 2 Resources

- Numicon
- Cubes
- Bead strings
- Rekenreks
- Dienes
- Place value grid
- Ten frames & double sided counters

- Part whole models
- Bar models
- Cuisenaire rods
- Countable concrete objects (shells, acorns, buttons, pebbles etc)
- Times table grid
- Coins
- Number lines

NCETM spine materials
(addition& subtraction)

NCETM spine materials
(multiplication & division)

NCETM spine materials
(fractions)

Year 3 and 4 Resources

- Numicon
- Cubes
- Dienes / Base 10
- Place value grid
- Place value counters
- Gattegno chart
- Cuisenaire
- Number lines

- Times table grid
- Money
- Printed scales with intervals denoted (in a range of metric measures)
- Fraction puzzles
- Fraction shapes
- Equivalent fractions wall
- Part whole models
- Bar models

NCETM spine materials
(addition& subtraction)

NCETM spine materials
(multiplication & division)

NCETM spine materials
(fractions)

Year 5 and 6 Resources

- Dienes / Base ten
- Place value grid
- Place value counters (including decimals)
- Cuisenaire rods
- Times table grid
- Cubes
- Numicon
- Double-sided counters

- Gattegno chart
- Equivalent fractions chart
- Printed scales with both intervals denoted and partially denoted (in a range of metric measures)
- Fraction cubes
- Money
- Bead strings
- Bar models

NCETM spine materials
(addition& subtraction)

NCETM spine materials
(multiplication & division)

NCETM spine materials
(fractions)

Vocabulary

Year 1 vocabulary continued on next slide

New maths vocabulary for 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 more is..?	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	Full, half full, empty Holds Container Weigh, weighs, balances Heavy, heavier, heaviest, light, lighter, lightest Scales Time 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 Today, yesterday, tomorrow	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 Direction 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 Equal parts, four equal 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, record, trace, copy, complete, finish,

Vocabulary

Year 1 vocabulary continued on next slide

Digit Numeral Figure(s) Compare (In) order/a different order Size Value Between, halfway between Above, below	Subtract, take away, minus How many fewer is…than..? how much less is..?	Share, share equally Group in pairs, threes, etc. Equal groups of Divide, divided by, left, left over	Before, after Next, last 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	backwards, sideways Across Close, far, near Along, through To, from, towards, away from Movement Slide, roll, turn, whole turn, half turn Stretch, bend			end 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

Vocabulary

			Long, longer, longest, short, shorter shortest, tall, taller, tallest, high, higher, highest Low, wide, narrow, deep, shallow, thick, 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				

Vocabulary

New maths vocabulary for 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

Existing vocabulary from Year 1 should also be covered.

Year 1 Vocabulary

Vocabulary

New maths vocabulary for 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

New maths vocabulary for year 4						
Number and place value	Multiplication and division	Measure	Geometry (position and direction)	Geometry (properties of shape)	Fractions and decimals	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

Existing vocabulary from Years 1 and 2 should also be covered.

Year 1 Vocabulary

Year 2 Vocabulary

Vocabulary

New maths vocabulary for 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

New maths vocabulary for 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

Existing vocabulary from Years 1, 2 3 and 4 should also be covered.

Year 1 Vocabulary

Year 2 Vocabulary

Years 3 and 4 Vocabulary