Addition
Reception – Year 6

Practical examples

- Counting real objects – In construction and small world play, provide plans for models showing numbers e.g. 10 pieces of lego
- Use of practical materials for counting e.g. encouraging children to provide correct number of pennies for a ticket costing 5p

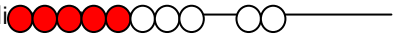
Pictures / marks

Children are encouraged to develop a mental picture of the number system in their heads to use for calculation. They develop ways of recording calculations using pictures, etc.

There are 3 cars in the garage. 2 more arrive. How many are there altogether?

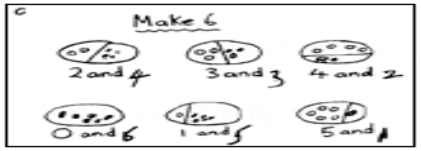
Bead strings or bead bars

They use practical resources to support calculation and teachers *demonstrate* the use of the number li



Informal jottings

Drawing adding pictures e.g. Can the children make 6 in a variety of ways?



Signs and symbols

Record own number sentences, linked to a practical example

3 + 2 = □ □ = 3 + 2

3 + □ = 5 5 = □ + 2

□ + 2 = 5 5 = 3 + □

□ + □ = 5 5 = □ + □

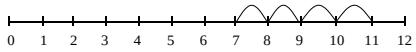
Record a partitioned number as a number sentence

Eg 57= 50 + 7

Number lines

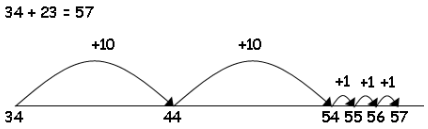
Reinforce counting on a number track.

7 + 4 = 11



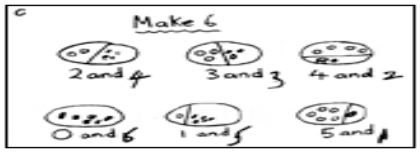
Empty number lines

Children will begin to use 'empty number lines' themselves starting with the larger number and counting on. Starting with counting in ones, then tens, hundreds etc.



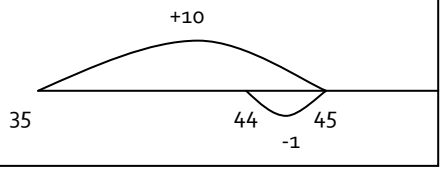
Inverse

Drawing adding pictures e.g. Can the children make 6 in a variety of ways?



Add a near multiple of 10

35 + 9 = 44



Informal jottings

Partition into tens and ones and recombine

23 + 12 = 23 + 10 + 2

= 33 + 2

= 35

Adding fractions

Adding with same denominator

¼ + 2/4 = ¾

Adding by finding common denominators.

3/5 + 4/15 =

9/15 + 4/15 = 13/15

Pairs totalling multiples of ten

24 + 28 + 16 + 32 = 20 + 10

24 + 16 = 40

28 + 32 = 60

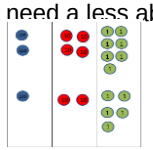
60 + 40 = 100

Explaining in words

To add 23 and 17 I added 23 and 7 to make 30 and added 10 more to total 40

Expanded column addition

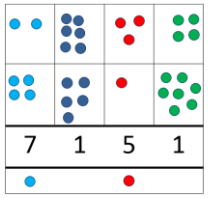
Modelled with place value counters (Dienes could be used for those who need a less abs



200 + 40 + 7

100 + 20 + 5

300 + 60 +12 = 372



2634
+4517
7151

These methods will be extended to use whole numbers more than 4 digits (up to 7) and decimal numbers.

e.g. 366.7 + 462.52

Children only progress to next stage once they have a secure understanding.

When children are secure with these methods – see Appendix 1

(Formal written method)

Subtraction
Reception – Year 6

Practical examples

- Finding one (or more) less than
- Pictures of calculations
- Pose problems and questions related to everyday routines

Pictures / marks

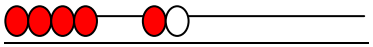
There were 17 bean bags in a bucket.

Luke took 9. How many are in the bucket?

Bead strings or bead bars

Bead strings or bead bars can be used to illustrate subtraction.

6 – 4 = 2



Signs and symbols

5 - 2 = = 5 - 2

5 - = 3 3 = - 2

- 2 = 3 3 = 5 -

- = 3 3 = -

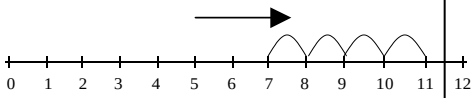
Children understand that the order of numbers in a subtraction calculation matters.

Number lines

Children then begin to use numbered lines to support their own calculations - using a numbered line to count back in ones.

Counting on

*the **difference** between 7 and 11*



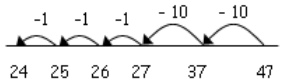
Recording by

- drawing jumps on prepared lines
- constructing own lines

Counting back:

First counting back in tens and ones.

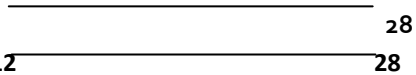
47 – 23 = 24



Blank Number lines

Children use blank numbers to work out subtraction sums in 2 ways – taking away and finding the difference.

28 – 12 =



Informal jottings

37 - 12 = 37 - 10 - 2

37 – 10 = 27

27 – 2 = 25

Use jottings to solve problems involving subtraction.

Explaining in Words

Children can find differences in practical situations

Use of 100 square to support counting back in tens

50 - 29

I did 50 take away 30 then added 1.

Subtracting fractions

Subtracting with same denominator ¾ - ¼ = 2/4

Subtracting by finding common denominators.

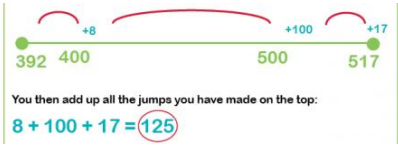
7/8 – 1/4 =

7/8 – 2/8 = 5/8

Written method

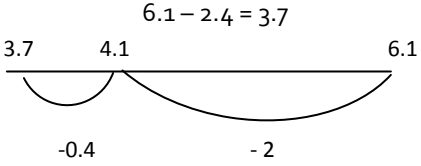
Complimentary addition.

517 – 392



Knowledge of number facts

Use known number facts and place value to subtract.



These methods will be extended to use whole numbers more than 4 digits (up to 7) and decimal numbers.

e.g. 86.26 – 34.8 =

Children only progress to next stage once they have a secure understanding.

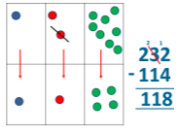
When children are secure with these methods – see Appendix 1

(Formal written method)

Expanded column subtraction with exchanging (decomposition)

Modelled with place value counters progressing to calculations with 4 digit numbers.

(Extend to 7 digits)



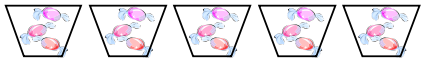
Multiplication
Reception – Year 6

Practical examples

- Pairs of socks in 2s on a washing line
- Counting in 2s and 10s
- Count repeated groups of the same size
- Sort real objects and pictures into sets of equal number, whilst counting aloud
- Show photos of hands on IWB. How can we arrange them to make counting the fingers easier?
- Role play opportunities… 'We'll need enough for 6 of us'

Pictures / marks

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



Signs and symbols

6 x 2 = = 2 x 6
6 x = 12 12 = x 6
x 2 = 12 12 = 2 x
x = 12 12 = x

Number lines

Children can move along a number line. E.g. Jumping forward along a number track in ones and twos and fives and tens.
They will work on practical problem solving activities involving equal sets or groups.
(Recording on a number line modelled by the teacher when solving problems)

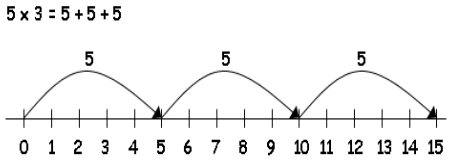
Link counting in twos, fives and tens to jumping along a number line.

Informal jottings

Children will develop their understanding of multiplication and use jottings to support

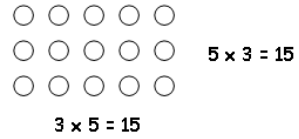
Repeated addition

2 X 4 = 2 + 2 + 2 + 2
Repeated addition can be shown easily on a number line:



Arrays

Children should be able to model a multiplication calculation using an array. This knowledge will support with the development of the grid method.



✓ **Commutativity**

Children should know that 3 x 5 has the same answer as 5 x 3.

Multiplying fractions

Children multiply fractions by multiplying the numerators, the denominators and then look to simplify the answer if possible.

1/3 x 1/4 = 1/12

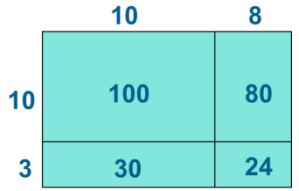
2/3 x 1/4 = 2/12 = 1/6

Times Tables

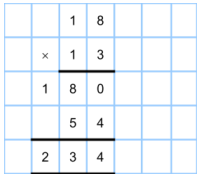
Chanting of tables is supported by counting stick or visual image of a number line.

Grid method

Children to explore how the grid method can help to support the visual representation of an array.



To then record jottings in a formal way.



These methods will be extended to use whole numbers up to 4 digits by 1 or more digit.
Multiply a 1 digit with up to 2 decimal places by a whole number.
Children only progress to next stage once they have a secure understanding.
When children are secure with these methods – see Appendix 1
(Formal written method)

Division
Reception – Year 6

Practical examples

- In the role play area share the place settings between 2 children
- Group bags of sweets for the teddies

Pictures / marks

Grouping:

How many pairs of socks are there in the 'launderette'?

Children will understand equal groups and share items out in play and problem solving.

Informal jottings

Solve problems through drawing a diagram

E.g. 15 children sit at 3 tables. How many children are at each table if there is the same number at each?

Signs and symbols

12 ÷ 2 = = 12 ÷ 2

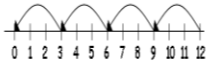
12 ÷ = 6 6 = ÷ 2

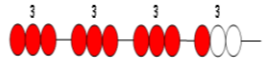
÷ 2 = 6 6 = 12 ÷

÷ = 6 6 = ÷

Repeated subtraction using a number line

✓ 12 ÷ 3 = 4





The bead bar will help children with interpreting division calculations such as 10 ÷ 5 as 'how many 5s make 10?'

Using symbols

Using symbols to stand for unknown numbers to complete equations using inverse operations

□ ÷ 2 = 4

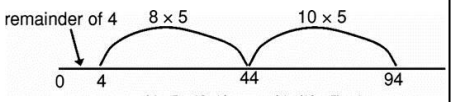
20 ÷ △ = 4

□ ÷ △ = 4

Chunking on a number line

✓ Using repeated subtraction and known number facts to divide.

✓ 94 ÷ 5 = 18r4

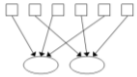


Informal jottings

Children will develop their understanding of division and use jottings to support calculation

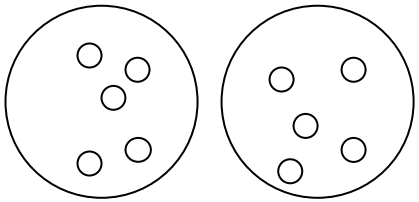
✓ **Sharing equally**

6 sweets shared between 2 people, how many do they each get?



Sharing

10 ÷ 2



Grouping

10 ÷ 2=

O O	O O	O O	O O	O O

Dividing fractions

Divide proper fractions by whole numbers, for example

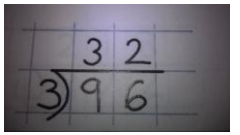
1/3 ÷ 2 = 1/6

Continue to develop chunking on a numberline. ***Quotients*** expressed as fraction or decimal fraction.

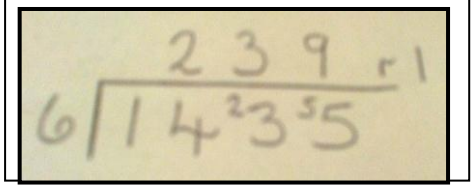
Extend to 4 digit ÷ 1 digit.

Formal Written method

Once children are secure with division as grouping and can use a number line, move onto short division for larger 2 digit numbers (no remainders)



Continue with larger numbers and remainders (include fractions and decimals)



These methods will be extended to use whole numbers up to4 digits by a 2 digit number. Divide numbers with up to 2 decimal places. Children only progress to next stage once they have a secure understanding.

When children are secure with these methods – see Appendix 1 (Formal written method)