

ADDITION GUIDELINES

Year One

+ = signs and missing numbers

Children need to understand the concept of equality before using the '=' sign. Calculations should be written either side of the equality sign so that the sign is not just interpreted as 'the answer'.

$$2 = 1 + 1$$

$$2 + 3 = 4 + 1$$

$$3 = 3$$

$$2 + 2 + 2 = 4 + 2$$

Missing numbers need to be placed in all possible places.

$$3 + 4 = \square \qquad \square = 3 + 4$$

$$3 + \square = 7 \qquad 7 = \square + 4$$

$$\square + 4 = 7 \qquad 7 = 3 + \square$$

$$\square + \nabla = 7 \qquad 7 = \square + \nabla$$

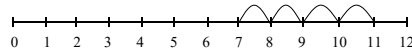
Number bonds to 20

Add one and two digit numbers to 20

The Number Line

Children use a numbered line to count on in ones. Children use number lines and practical resources to support calculation and teachers *demonstrate* the use of the number line.

$$7 + 4$$



Solve one step problems using concrete objects and pictorial representations.

Language – put together, add, altogether, total, more than

Year Two

+ = signs and missing numbers

Continue using a range of equations as in Year 1 but with appropriate, larger numbers to 100.

Know and use number bonds to 20 fluently and related facts to 100.

Add using concrete objects, pictorial representation and mentally.

Extend to

$$14 + 5 = 10 + \square$$

$$24 + 30 =$$

$$23 + 32 =$$

$$3 + 6 + 7$$

and

$$32 + \square + \square = 100 \quad 35 = 1 + \square + 5$$

$6 + 7 = 7 + 6$ (commutativity and associativity of addition)

Partition into tens and ones and recombine

$$12 + 23 = 10 + 2 + 20 + 3$$

$$= 30 + 5$$

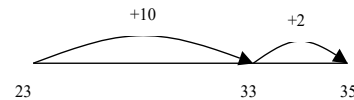
$$= 35$$

Count on in tens and ones

$$23 + 12 = 23 + 10 + 2$$

$$= 33 + 2$$

$$= 35$$



The Empty Number Line:

Partitioning and bridging through 10.

The steps in addition often bridge through a multiple of 10

e.g.

Children should be able to partition the 7 to relate adding the 2 and then the 5.

$$8 + 7 = 15$$

Year Three

+ = signs and missing numbers

Continue using a range of equations as in Year 1 and 2 but with appropriate, larger numbers up to 3 digits.

Mentally

3 digit numbers and ones

$$234 + 7$$

3 digit numbers and tens

$$234 + 20$$

3 digit numbers and hundreds.

$$234 + 300$$

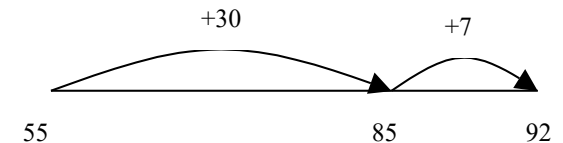
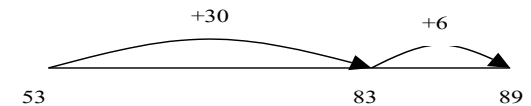
Partition into tens and ones

- Partition both numbers and recombine.
- Count on by partitioning the second number only e.g.

$$36 + 53 = 53 + 30 + 6$$

$$= 83 + 6$$

$$= 89$$



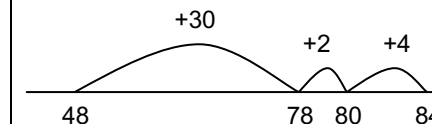
Add a near multiple of 10 to a two-digit number

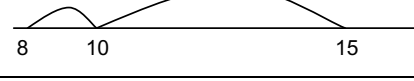
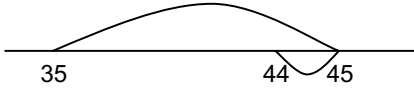
Secure mental methods by using a number line to model the method. Continue as in Year 2 but with appropriate numbers

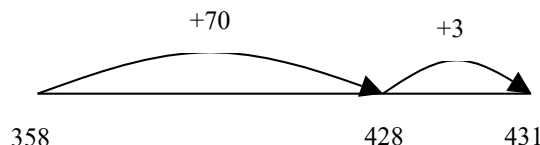
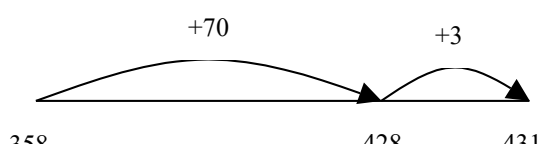
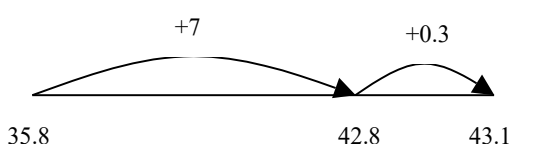
e.g. $35 + 19$ is the same as $35 + 20 - 1$.

Children need to be secure adding multiples of 10 to any two-digit number including those that are not multiples of 10.

$$48 + 36 = 84$$



		<p><u>Formal Written Methods</u> $83 + 42 = 125$ 1) Use of partitioning $80 + 40 + 3 + 2 = 120 + 5$ $= 125$</p> <p>2) Horizontal expansion $80 + 3$ $+ 40 + 2$ $120 + 5 = 125$</p> <p>3) Vertical expansion</p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: right;">83</td> <td style="text-align: right;">83</td> </tr> <tr> <td style="text-align: right;">$+ 42$</td> <td style="text-align: right;">$+ 42$</td> </tr> <tr> <td style="text-align: right;">5</td> <td style="text-align: right;">125</td> </tr> <tr> <td style="text-align: right;">120</td> <td style="text-align: right;">1</td> </tr> <tr> <td style="text-align: right;">125</td> <td></td> </tr> </table> <p>3 digit example</p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: right;">235</td> </tr> <tr> <td style="text-align: right;">$+ 456$</td> </tr> <tr> <td style="text-align: right;">691</td> </tr> <tr> <td style="text-align: right;">1</td> </tr> </table>	83	83	$+ 42$	$+ 42$	5	125	120	1	125		235	$+ 456$	691	1
83	83															
$+ 42$	$+ 42$															
5	125															
120	1															
125																
235																
$+ 456$																
691																
1																
	<p>Add 9 or 11 by adding 10 and adjusting by 1 e.g. Add 9 by adding 10 and adjusting by 1 $35 + 9 = 44$ $+10$</p> 															
	-1															
	Language – sum of															

Year Four	Year Five	Year Six
<p>+ = signs and missing numbers Continue using a range of equations as in previous years but with appropriate numbers up to 4 digits. <u>Mental Strategies.</u></p> <p><u>Partition into hundreds, tens and ones and recombine</u> Either partition both numbers and recombine or partition the second number only e.g. $358 + 73 = 358 + 70 + 3$ $= 428 + 3$ $= 431$</p> 	<p>+ = signs and missing numbers Continue using a range of equations as in previous years but with appropriate numbers. <u>Mental Strategies</u></p> <p><u>Partition into thousands, hundreds, tens and ones and recombine</u> Either partition both numbers and recombine or partition the second number only e.g. $1358 + 473 = 1358 + 400 + 70 + 3$ $= 1758 + 70 + 3$ $= 1828 + 3$ $= 1831$</p> 	<p>+ = signs and missing numbers Continue using a range of equations as previous years but with appropriate numbers. <u>Mental Strategies.</u></p> <p><u>Partition into hundreds, tens, ones and decimal fractions and recombine</u> Either partition both numbers and recombine or partition the second number only e.g. $35.8 + 7.3 = 35.8 + 7 + 0.3$ $= 42.8 + 0.3$ $= 43.1$</p> 
<p>Add or subtract the nearest multiple of 10 or 100, then adjust Continue as in Year 2, 3 and 4 but with appropriate numbers e.g. $458 + 79 =$ is the same as $458 + 80 - 1$</p>	<p>Add or subtract the nearest multiple of 10 or 100, then adjust</p>	<p>Add the nearest multiple of 10, 100 or 1000, then adjust</p>

<p><u>Pencil and paper procedures</u> $367 + 185 = 431$ either or</p> $\begin{array}{r} 367 \\ + 185 \\ \hline 12 \\ 140 \\ 400 \\ 552 \end{array}$ <p>leading to</p> $\begin{array}{r} 367 \\ + 185 \\ \hline 552 \\ 11 \end{array}$ <p>Extend to decimals <u>in the context of money.</u></p> <p><u>Two step problems in context</u> Make decisions about which operation and method to use.</p>	<p>Continue as in Year 2, 3 and 4 but with appropriate numbers e.g. $458 + 79 =$ is the same as $458 + 80 - 1$</p> <p><u>Pencil and paper procedures</u> Extend to numbers with at least four digits $3587 + 675 = 4262$</p> $\begin{array}{r} 3587 \\ + 675 \\ \hline 4262 \\ 111 \end{array}$ <p>Revert to expanded methods if the children experience any difficulty. Extend to up to two places of decimals (same number of decimal places) and adding several numbers (with different numbers of digits).</p> $\begin{array}{r} 72.8 \\ + 54.6 \\ \hline 127.4 \\ 11 \end{array}$ <p><u>Multi step problems in context</u> Make decisions about which operation and method to use and why.</p>	<p>Continue as in Year 2, 3, 4 and 5 but with appropriate numbers including extending to adding 0.9, 1.9, 2.9 etc</p> <p><u>Pencil and paper procedures</u> Extend to numbers with any number of digits and decimals with 1, 2 and/or 3 decimal places. $13.86 + 9.481 = 23.341$</p> $\begin{array}{r} 13.86 \\ + 9.481 \\ \hline 23.341 \\ 111 \end{array}$ <p>Revert to expanded methods if the children experience any difficulty.</p> <p><u>Multi step problems in context</u> Make decisions about which operation and method to use and why.</p>
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SUBTRACTION GUIDELINES

Year One

- = signs and missing numbers

$$7 - 3 = \square \quad \square = 7 - 3$$

$$7 - \square = 4 \quad 4 = \square - 3$$

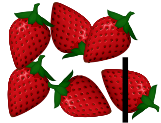
$$\square - 3 = 4 \quad 4 = 7 - \square$$

$$\square - \nabla = 4 \quad 4 = \square - \nabla$$

Number bonds to 20.

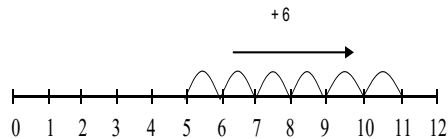
Subtract one and two digit numbers from 20 including zero.

- Understand subtraction as 'take away'



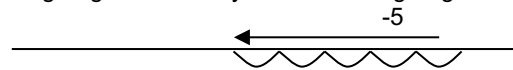
- Find a 'difference' by counting up;

I have saved 5p. The socks that I want to buy cost 11p. How much more do I need in order to buy the socks?



- Use practical and informal written methods to support the subtraction of a one-digit number from a one digit or two-digit number and a multiple of 10 from a two-digit number.

I have 11 toy cars. There are 5 cars too many to fit in the garage. How many cars fit in the garage?



Use the vocabulary related to addition and subtraction and symbols to describe and record addition and subtraction number sentences
Recording by

Year Two

- = signs and missing numbers

Continue using a range of equations as in Year 1 but with appropriate numbers.
Recall and use number bonds to 20 fluently and related facts to 100.

$$10 - 3 = 7$$

$$100 - 30 = 70$$

Add using concrete objects, pictorial representation and mentally.

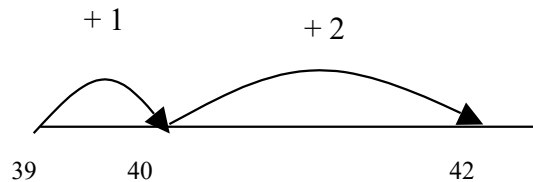
Recognise and use inverse relationship between addition and subtraction.

example

$$\text{Extend to } 14 + 5 = 20 - \square$$

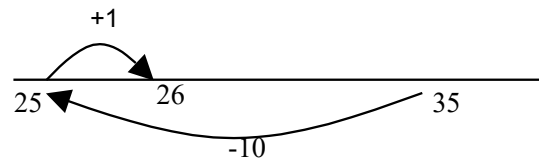
Find a small difference by counting up

$$42 - 39 = 3$$



Subtract 9 or 11. Begin to add/subtract 19 or 21

$$35 - 9 = 26$$

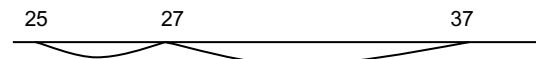


Use known number facts and place value to subtract (partition second number only)

$$37 - 12 = 37 - 10 - 2$$

$$= 27 - 2$$

$$= 25$$



Bridge through 10 where necessary

Year Three

- = signs and missing numbers

Continue using a range of equations as in Year 1 and 2 but with appropriate, larger numbers up to 3 digits.

Mentally

3 digit numbers and ones

$$234 - 7$$

3 digit numbers and tens

$$234 - 20$$

3 digit numbers and hundreds.

$$534 - 300$$

Find a small difference by counting up

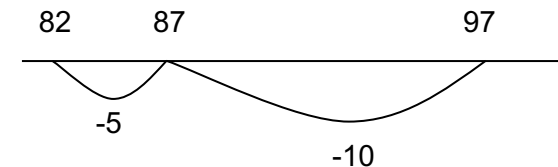
Continue as in Year 2 but with appropriate numbers e.g.
 $102 - 97 = 5$

Subtract mentally a 'near multiple of 10' to or from a two-digit number

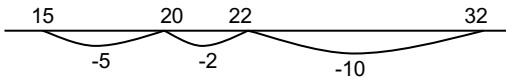
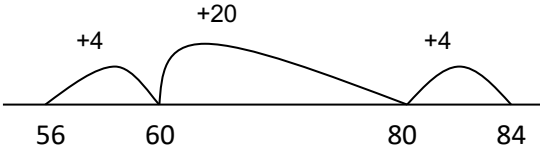
Continue as in Year 2 but with appropriate numbers e.g.
 $78 - 49$ is the same as $78 - 50 + 1$

Use known number facts and place value to subtract

Continue as in Year 2 but with appropriate numbers
e.g. $97 - 15 = 72$



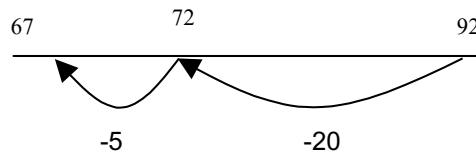
With practice, children will need to record less information and decide whether to count back or forward. It is useful to ask children whether counting up or back is the more efficient for calculations such as $57 - 12$, $86 - 77$ or $43 - 28$.

<p>- drawing jumps on prepared lines - constructing own lines</p> <p>Solve one step problems using concrete objects and pictorial representation.</p> <p>Language – take away, difference between , distance between, less than</p>	<p>32 - 17</p>  <p>Solve problems using concrete objects and pictorial representation, including those involving number, quantities and measures.</p> <p>Language - difference</p>	<p>Pencil and paper procedures</p> <p>Complementary addition 84 – 56 = 28</p>  <p>Formal Written method (Not needing decomposition)</p> $\begin{array}{r} 567 \\ - 234 \\ \hline 333 \end{array}$ <p>Solve problems using number facts, place value and more complex subtraction.</p>
<p>Year Four</p>	<p>Year Five</p>	<p>Year Six</p>
<p>Find a small difference by counting up e.g. 5003 – 4996 = 7</p> <p>This can be modelled on an empty number line (see complementary addition below). Children should be encouraged to use known number facts to reduce the number of steps.</p> <p>Subtract the nearest multiple of 10 or 100, then adjust.</p>	<p>Find a difference by counting up e.g. 8006 – 2993 = 5013</p> <p>This can be modelled on an empty number line (see complementary addition below).</p> <p>Subtract the nearest multiple of 10 or 100, then adjust.</p> <p>Continue as in Year 2, 3 and 4 but with appropriate numbers.</p>	<p>Find a difference by counting up e.g. 8000 – 2785 = 5215</p> <p>To make this method more efficient, the number of steps should be reduced to a minimum through children knowing:</p> <ul style="list-style-type: none"> ▪ Complements to 1, involving decimals to two decimal places (0.16 + 0.84) ▪ Complements to 10, 100 and 100 <p>Subtract the nearest multiple of 10, 100 or 1000, then adjust</p>

Continue as in Year 2 and 3 but with appropriate numbers. To 4 digits

Use known number facts and place value to subtract

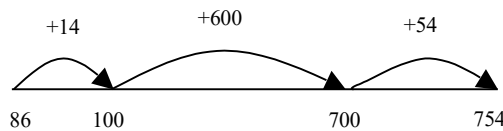
$92 - 25 = 67$



Pencil and paper procedures

Complementary addition

$754 - 86 = 668$



For those children with a secure mental image of the number line they could record the jumps only:

$754 - 86 = 668$

14 (100)

600 (700)

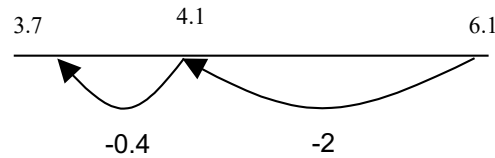
54 (754)

668

Formal Written methods

Use known number facts and place value to subtract

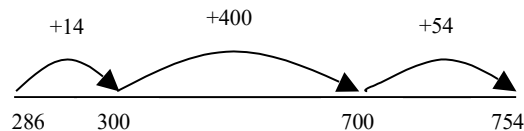
$6.1 - 2.4 = 3.7$



Pencil and paper procedures

Complementary addition

$754 - 286 = 468$



OR

$754 - 286 = 468$

14 (300) can be refined to 14 (300)

400 (700) 454 (754)

54 (754) 468

468

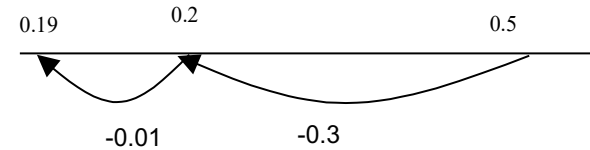
Reduce the number of steps to make the calculation more efficient.

Extend to 2 places of decimal

Continue as in Year 2, 3, 4 and 5 but with appropriate numbers.

Use known number facts and place value to subtract

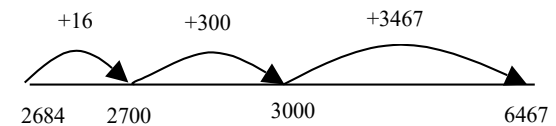
$0.5 - 0.31 = 0.19$



Pencil and paper procedures

Complementary addition

$6467 - 2684 = 3783$



OR

$6467 - 2684 = 3783$

16 (2700) can be refined to 316 (3000)

300 (3000) 3467 (6467)

3467 (6467) 3783

3783

Reduce the number of steps to make the calculation more efficient.

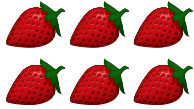
Extend to 2 places of decimals

<p>874</p> <p>- <u>523</u></p> <p><u>351</u></p> <p><u> </u></p> <p>If able to cope with simple decomposition</p> <p> ³ 1</p> <p><u> </u> 2 4 5</p> <p><u> </u> 2 6</p> <p> 1 1 9</p> <p><u>Two step problems in context</u></p> <p>Make decisions about which operation and method to use.</p>	<p>Formal Written methods</p> <p>8 12 1</p> <p>88 2</p> <p>- <u>4 5 7</u></p> <p><u> </u> 4 7 5</p> <p>Check answers by using inverse operation and estimation</p> <p><u>Multi step problems in context</u></p> <p>Make decisions about which operation and method to use and why.</p>	<p>Formal Written methods</p> <p>8 12 1 6 9 14 1</p> <p>88 2 £10.56</p> <p><u> </u> 4 5 7 <u> </u> -23.97</p> <p><u> </u> 4 7 5 <u> </u> 46.59</p> <p>Check answers by using inverse operation and estimation</p> <p><u>Multi step problems in context</u></p> <p>Make decisions about which operation and method to use and why.</p>
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MULTIPLICATION GUIDELINES

Year One

Multiplication is related to doubling and counting groups of the same size.



Looking at columns
 $2 + 2 + 2$
 3 groups of 2

Looking at rows
 $3 + 3$
 2 groups of 3

Counting using a variety of practical resources

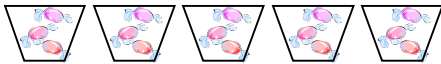
Counting in 2s e.g. counting socks, shoes, animal's legs...

Counting in 5s e.g. counting fingers, fingers in gloves, toes...

Counting in 10s e.g. fingers, toes...

Pictures / marks

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



Arrays and repeated addition

● ● ● ● 4×2 or $4 + 4$
 ● ● ● ●
 2×4 or $2 + 2 + 2 + 2$

One step problems using concrete objects and pictorial representation

Language – groups of, lots of, double

Year Two

Recall and use multiplication facts for 2, 5 and 10 multiplication table.

Relate to odd and even numbers.

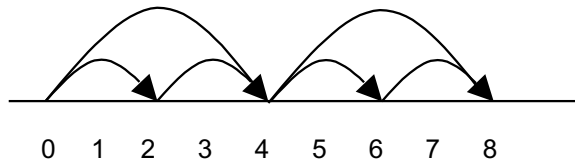
x = signs and missing numbers

$7 \times 2 = \square$ $\square = 2 \times 7$
 $7 \times \square = 14$ $14 = \square \times 7$
 $\square \times 2 = 14$ $14 = 2 \times \square$
 $\square \times \nabla = 14$ $14 = \square \times \nabla$

$3 \times 4 = 4 \times 3$ (commutativity of multiplication)
 Use of inverse and relationship with division facts.
 $3 \times 4 = 12$ $12 \div 4 = 3$

Arrays and repeated addition

● ● ● ● 4×2 or $4 + 4$
 ● ● ● ●
 2×4 or $2 + 2 + 2 + 2$

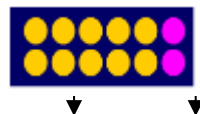


Doubling multiples of 5 up to 50

$15 \times 2 = 30$
 Relate to inverse operation for halving.

Partition

Children need to be secure with partitioning numbers into 10s and 1s and partitioning in different ways: $6 = 5 + 1$ so e.g. Double 6 is the same as double five add double one.



AND double 15
 $10 + 5$

Year Three

Recall and use multiplication facts for 3, 6, and 8

x = signs and missing numbers

Continue using a range of equations as in Year 2 but with appropriate numbers.

Use commutativity and associativity
 $4 \times 12 \times 5 = 4 \times 5 \times 12 = 20 \times 12 = 240$

Arrays and repeated addition

Continue to understand multiplication as repeated addition and continue to use arrays (as in Year 2).

Doubling multiples of 5 up to 50

$35 \times 2 = 70$

Partition

X	30	5	
2	60	10	=70

Use known facts and place value to carry out simple multiplications

Use the same method as above (partitioning), e.g.

$32 \times 3 = 96$

x	30	2	
3	90	6	= 96

Progress to formal written method

2digit by 1 digit

24
X 6
144
2

$$20 + 10 = 30$$

OR

$$\begin{array}{r|rr} X & 10 & 5 \\ \hline 2 & 20 & 10 & = 30 \end{array}$$

Solve problems using multiplication, using materials, arrays, repeated addition, multiplication table facts, including problems in context.

Solve problems using multiplication including problems in context.

Apples cost 26p each , how much will 8 cost

A plant measures 23cm tall. In three weeks its height trebles , how tall will it be?

Year Four

x = signs and missing numbers

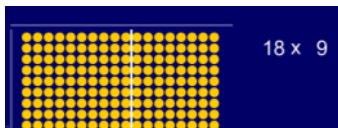
Continue using a range of equations as in previous years but with appropriate numbers

Recall and use multiplication facts to 12 x 12
Including understanding of multiplying by 0 and 1

Use knowledge of table facts to find factor pairs to 144.

Partition

Continue to use arrays:



$$18 \times 9 = 162$$

$$18 \times 9 = (10 \times 9) + (8 \times 9) = 162$$

or

$$47 \times 6 = 282$$

$$47 \times 6 = (40 \times 6) + (7 \times 6) = 282$$

OR

Use the grid method of multiplication (as below)

Pencil and paper procedures

Grid method

123 x 7 is approximately 120 x 10 = 1200

X	100	20	3	
7	700	140	21	= 861

Expanded Column Multiplication

Leading to formal method
3digit by 1 digit

Year Five

Recall and use multiplication facts to 12 x 12
Including understanding of multiplying by 0 and 1

Use knowledge of table facts to find all factor pairs of a number
And common multiples of a number.
Know all prime numbers to 100
Recognise and use square and cube numbers

Understand and use multiplying and dividing by 10, 100 and 1000, including decimals.
 $0.125 \times 100 = 12.5$
(use to support work on converting between metric measures)

Multiply numbers up to 4 digits by 2 and 1 digit numbers using a formal method

Partition

Use the grid method of multiplication (as below) and lead to formal written methods

Pencil and paper procedures

Grid method

72 x 38 is approximately 70 x 40 = 2800

x	70	2
30	2100	60
8	560	16

$$2100 + 60 = 2160$$

$$560 + 16 = 576 + 2736$$

72
X 38
576 (8 x 72 = 576)
2160 (30 x 72 = 21600)
2736
11

Children who are already secure with multiplication for TU x U and TU x TU should have little difficulty in using the same method for HTU x TU or applying decimals.

286
x 29
2574 (9 x 286 = 2574)

Year Six

Recall and use multiplication facts to 12 x 12
Identify common factors, common multiples and prime numbers.
Use in relation to equivalent fractions and problem solving

Know and use knowledge of order of operations when carrying out calculations involving 4 operations including use of brackets.
 $2 + 1 \times 3 = 5$
 $(2 + 1) \times 3 = 9$

Multiply numbers up to 4 digits by 2 digit numbers using the formal written method of long multiplications.

Use estimation to check answers to questions.

286 x 29 is approximately 300 x 30 = 9000

Children who are already secure with multiplication for TU x U and TU x TU should have little difficulty in using the same method for HTU x TU or applying decimals.

286	
x 29	
2574	(9 x 286 = 2574)
5720	(20 x 286 = 5720)
8294	
1	

Multi step problems in context involving all four operations.

Make decisions about which operation and method to use and why.

Make decisions regarding appropriate degree of accuracy.

Children should describe what they do by referring to the actual values of the digits in the columns. For example, the first step in 38×7 is 'thirty multiplied by seven', not 'three times seven', although the relationship 3×7 should be stressed.

$$\begin{array}{r} 30 + 8 \\ \times \quad 7 \\ \hline 56 \quad (8 \times 7 = 56) \\ 210 \quad (30 \times 7 = 210) \\ \hline 266 \end{array}$$

$$\begin{array}{r} 123 \\ \times \quad 8 \\ \hline 984 \\ 12 \end{array}$$

Solve problems using multiplication including problems in context.

A box of sweets holds 124 sweets, I buy 4 boxes, how many sweets will I have.

A cake weighs 250g, how much will 6 cakes weigh?

$$\frac{5720}{8294} \quad (20 \times 286 = 5720)$$

$$\frac{8294}{1}$$

1

Multi step problems in context

Make decisions about which operation and method to use and why.

Solve problems involving simple ratio.

Use knowledge of factors, multiples, squares and cubes to solve number problems.

$$4 \times 35 = 2 \times 2 \times 3 \times 7$$

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DIVISION GUIDELINES

Year One

Sharing

Requires secure counting skills
 -see counting and understanding number strand
 Develops importance of one-to-one correspondence
 See appendix for additional information on x and ÷ and aspects of number

Sharing – 6 sweets are shared between 2 people. How many do they have each?



Practical activities involving sharing, distributing cards when playing a game, putting objects onto plates, into cups, hoops etc.

Grouping

Sorting objects into 2s / 3s/ 4s etc
 How many pairs of socks are there?



There are 12 crocus bulbs. Plant 3 in each pot. How many pots are there?
 Jo has 12 Lego wheels. How many cars can she make?

One step problems using concrete objects and pictorial representation

Vocabulary, sharing, grouping, halving.

Year Two

÷ = signs and missing numbers

$$6 \div 2 = \square \quad \square = 6 \div 2$$

$$6 \div \square = 3 \quad 3 = 6 \div \square$$

$$\square \div 2 = 3 \quad 3 = \square \div 2$$

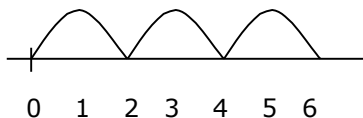
$$\square \div \nabla = 3 \quad 3 = \square \div \nabla$$

Use related facts from 2, 5 and 10 multiplication tables.

Grouping

Link to counting and understanding number strand
 Count up to 100 objects by grouping them and counting in tens, fives or twos;
 Find one half, one quarter and three quarters of shapes and sets of objects
 6 ÷ 2 can be modelled as:
 There are 6 strawberries.
 How many people can have 2 each? How many 2s make 6?

6 ÷ 2 can be modelled as:

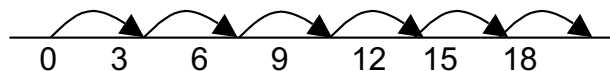


Understand division as sharing and grouping

18 ÷ 3 can be modelled as:
 Sharing – 18 shared between 3 (see Year 1 diagram)

OR

Grouping - How many 3's make 18?



Solve problems involving division, using concrete materials, arrays, repeated subtraction, mental methods, and division facts
 Including problems in context – measures, money,

Year Three

÷ = signs and missing numbers

Continue using a range of equations as in Year 2 but with appropriate numbers and **using related multiplication facts form 3, 4, and 8 multiplication tables.**

Mental Calculation- Continue from year 2

Derive related facts for division

$$20 \times 3 = 60$$

$$60 \div 3 = 20$$

Remainders

16 ÷ 3 = 5 r1
 Sharing - 16 shared between 3, how many left over?
 Grouping – How many 3's make 16, how many left over?
 e.g.



Formal Method

Progressing to the use of short division

$$\begin{array}{r} 22 \\ 4 \overline{) 88} \end{array}$$

Solving problems

Solve problems in context involving measures and money.

Correspondence problems such as

There are 20 cakes in a box. If I can put 5 in a box, how many boxes can I fill?

Simple scaling problems – half as many, a quarter of.

In the context of money count forwards and backwards using 2p, 5p and 10p coins

Practical grouping e.g. in PE

12 children get into teams of 4 to play a game. How many teams are there?



DIVISION GUIDELINES

Year Four

÷ = signs and missing numbers

Continue using a range of equations as in previous years but with appropriate numbers.

Recall and use multiplication and division facts up to 12×12 . Derive associated division facts.

$$6 \div 3 = 2$$

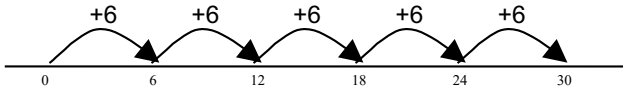
$$60 \div 3 = 20$$

Understand dividing by 1

Sharing and grouping

$30 \div 6$ can be modelled as:

grouping – groups of 6 placed on no. line and the number of groups counted e.g.



sharing – sharing among 6, the number given to each person

Remainders

$$41 \div 4 = 10 \text{ r}1$$



$$41 = (10 \times 4) + 1$$

Pencil and paper procedures- Chunking.

$72 \div 5$ lies between $50 \div 5 = 10$ and $100 \div 5 = 20$

* Partition the dividend into multiples of the divisor:

e.g $72 = 50 + 22$

$$50 \div 5 = 10$$

$$22 \div 5 = 4 \text{ r}2 \rightarrow 10 + 4 \text{ r}2 = 14 \text{ r}2$$

Year Five

Divide numbers mentally using known facts.

Derive associated facts.

Identify common factors of numbers.

Divide up to 4 digits by 1 digit number using short division

$$\begin{array}{r} \text{quotient} \\ \text{divisor } 5 \overline{) 847} \text{ dividend} \end{array}$$

$$\begin{array}{r} 169 \text{ r}2 \\ 5 \overline{) 847} \end{array}$$

Quotients expressed as remainder, fractions or decimal fractions

$61 \div 4 = 15 \text{ r}1$ or $15 \frac{1}{4}$ or 15.25 depending upon context.

61 m of cloth divided into 4 pieces 15.25m

60 sweets divided between 4 people . $15 \text{ r}1$ sweet

61 pizzas divided between 4 groups. $15 \frac{1}{4}$ pizzas.

Divide numbers including decimals by 10, 100 and 1000.

Use in context of money and measures.

Change 345cm to 3.45m

Division needing the answer to be rounded up.

A taxi can carry 4 passengers. 18 people need to be taken to the airport- how many taxis do they need?

Multi step problems in context

Make decisions about which operation and method to use and why.

Year Six

Divide numbers mentally using known facts.

Derive associated facts.

Identify common factors of numbers.

Know and use knowledge of order of operations when carrying out calculations involving 4 operations including use of brackets.

$$20 \div 5 + 5 = 9$$

$$20 \div (5 + 5) = 2$$

Divide numbers up to 4 digits by 2 digits using formal written method of long division.

$432 \div 15$

$$\underline{28 \text{ r}12} \quad \text{or} \quad 28 \frac{4}{5} \quad \text{or} \quad 28.8$$

$$\begin{array}{r} 15 \overline{) 432} \\ \underline{300} \\ 132 \\ \underline{120} \\ 12 \end{array}$$

Interpret remainders according to context , as a remainder, fraction or decimal.

Multi step problems in context using all 4 operations.

Make decisions about which operation and method to use and why.

Solve problems using simple ratio and fractions

OR

$$\begin{array}{r} 72 \\ - 50 \quad (10 \text{ groups}) \\ \hline 22 \\ - 20 \quad (4 \text{ groups}) \\ \hline 2 \end{array}$$

Answer : 14 remainder 2

Short Division for More Able Children

$$\begin{array}{r} \mathbf{1 \ 4 \ r \ 2} \\ 5 \overline{) 72} \end{array}$$

Use division to solve problems.

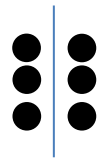
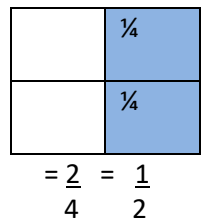
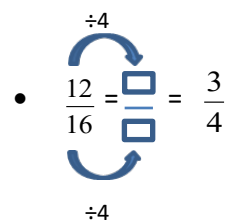
There are 72 bulbs in a sack. If 5 bulbs are planted in each flower pot how many bulbs would be left over?

Solve problems involving simple ratio.

Janet and John have 300 marbles.

They share them out so that John has twice as many as Janet. How many marbles does each child get?

Fractions Guidelines

Year One	Year Two	Year Three
	<p>EQUIVALENCE</p> <p>Write simple fractions</p> <p>Eg $\frac{1}{2}$ of 6 = 3 so $6 \div 2 = 3$</p>  <p>Recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$</p>  <p>$= \frac{2}{4} = \frac{1}{2}$</p>	<p>ADDITION AND SUBTRACTION OF FRACTIONS</p> <p>Add and subtract fractions with the same denominator within one whole.</p> $\frac{5}{7} + \frac{1}{7} = \frac{6}{7}$ $\frac{6}{8} - \frac{4}{8} = \frac{2}{8}$
Year Four	Year Five	Year Six
<p>ADDITION AND SUBTRACTION OF FRACTIONS</p> <p>Add and subtract fractions with the same denominator:</p> <ul style="list-style-type: none"> $\frac{15}{7} + \frac{1}{7} = \frac{16}{7}$ $\frac{16}{8} - \frac{4}{8} = \frac{12}{8}$ <p>MULTIPLYING AND DIVIDING OF DECIMALS</p>	<p>COMPARING FRACTIONS</p> <p>compare and order fractions whose denominators are all multiples of the same number</p> <ul style="list-style-type: none"> $\frac{1}{3}$ and $\frac{5}{12}$ $\frac{1}{3} = \frac{4}{12}$ <p>So, ordered from smallest to biggest:</p> $\frac{1}{3}, \frac{5}{12}$	<p>EQUIVALENCE</p> <p>Use common factors to simplify fractions</p>  <p>Use common multiples to express fractions in the same denominations</p> <ul style="list-style-type: none"> $\frac{1}{3}, \frac{5}{6}, \frac{8}{12}$

Find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths

$$24 \div 10 = 2.4$$

$\begin{array}{|c|c|} \hline \text{O.} & \text{t} \\ \hline 2 & 4 \\ \hline \end{array}$

2 ones
4 tenths

$$24 \div 100 = 0.24$$

$\begin{array}{|c|c|c|} \hline \text{O.} & \text{t} & \text{h} \\ \hline 0 & 2 & 4 \\ \hline \end{array}$

0 ones
2 tenths
4 hundredths

ADDITION AND SUBTRACTION OF FRACTIONS

Add and subtract fractions with the same denominator and multiples of the same number

- $\frac{2}{7} + \frac{3}{7} = \frac{2+3}{7} = \frac{5}{7}$

- $\frac{3}{11} - \frac{2}{11} + \frac{5}{11} = \frac{3-2+5}{11} = \frac{6}{11}$

Convert between mixed numbers and improper fractions.

- $1\frac{3}{4} = \frac{4}{4} + \frac{3}{4} = \frac{7}{4}$

MULTIPLICATION AND DIVISION OF FRACTIONS

Multiply proper fractions by whole numbers

- $\frac{2}{7} \times 21 = (21 \div 7) \times 2 = 3 \times 2 = 6$

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

$$\frac{5}{6} \times 2 = \frac{10}{12}$$

So, $\frac{4}{12}, \frac{10}{12}, \frac{8}{12}$

Associate a fraction with division and calculate decimal fraction equivalents for a simple fraction.

- $\frac{3}{8} = 3 \div 8 = 0.375$

(Refer to division procedures)

COMPARING FRACTIONS

Compare and order fractions, including fractions >1

- $\frac{2}{3}$ and $\frac{1}{5}$

Find common denominator

$$\frac{2}{3} \times 5 = \frac{10}{15}$$

$$\frac{1}{5} \times 3 = \frac{3}{15}$$

Can then order: $\frac{3}{15}, \frac{10}{15}$

So, $\frac{1}{5} < \frac{2}{3}$

Multiply mixed numbers by whole numbers

- $1\frac{4}{5} \times 2$

Convert to improper fraction

$$= \frac{9}{5} \times 2$$
$$= \frac{18}{5}$$

Change back to mixed numbers

$$= 3\frac{3}{5}$$

Encourage the children to use inequality sign, if there are only two numbers, to show greater than and less than.

$$1\frac{1}{5} \text{ and } 2\frac{2}{3}$$

(See year 5 converting mixed numbers and then above for common denominator and ordering.)

ADDITION AND SUBTRACTION OF FRACTIONS

Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions

(See equivalent fractions above and adding same denominator in year 5)

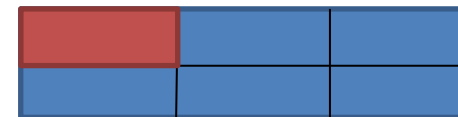
MULTIPLICATION AND DIVISION OF FRACTIONS

Multiply simple pairs of proper fractions, writing the answer in its simplest form.

- $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$

Divide proper fractions by whole numbers

- $\frac{1}{3} \div 2 = \frac{1}{6}$



MULTIPLYING AND DIVIDING OF DECIMALS

Multiply numbers with up to two d.p. by 1 digit and 2 digit whole numbers.

- 7×1.34

$(\times 100) 7 \times 134 = 938$

$= 938 \div 100$

$= 9.38$

(Refer to multiplication and division procedures)

Use written division methods in cases where the answer has up to two decimal places

(Refer to division procedures)