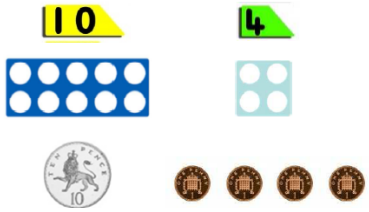
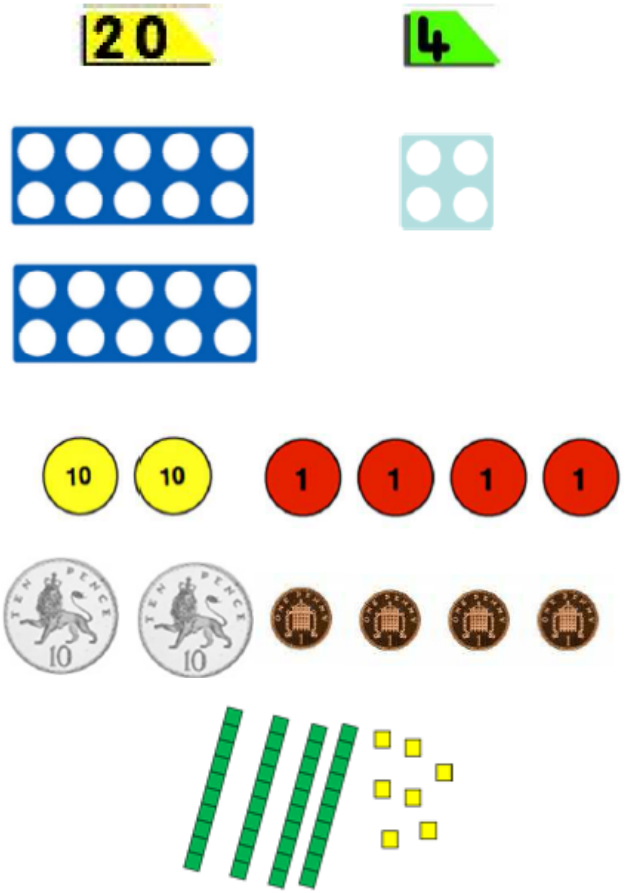
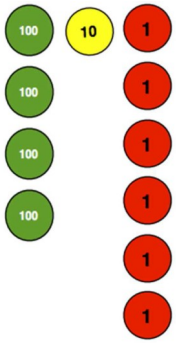
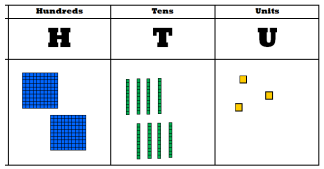
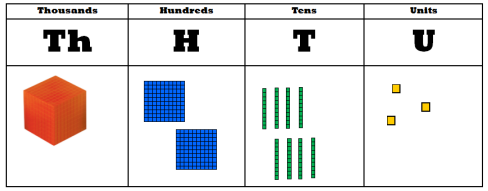
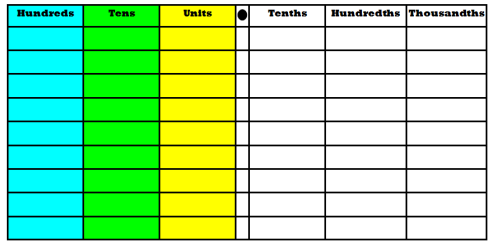
Redhill Primary School

Progression in the teaching of Place Value

Foundation	Year 1	Year 2
Understand numbers to 10	Understanding numbers to 20	Understanding numbers to 100
A Numicon plate is a resources that helps children • keep track of counting • see number relationships • learn number bonds to 10 • understand place value  Children a range of visual images to support understanding of number e.g. counters, dice, dominoes or playing cards etc. 	Children to build upon understanding of the base 10 system through the use of Numicon and other visual resources.  Children should be taught to build numbers with a range of different resources including Numicon and Diennes materials. 	Continue to develop place value understanding through the use of practical resources. 

Redhill Primary School

Progression in the teaching of Place Value

Year 3	Year 4	Year 5	Year 6
Understand numbers to 1000 and tenths	Understanding numbers to 10 thousand and tenths and hundredths	Understanding numbers to 1 million and to tenths, hundredths and thousandths	Understanding numbers to 10 million and to tenths, hundredths and thousandths
Continue to develop place value understanding through the use of manipulatives.   Use Diennes materials and place value charts.   *Children should be aware that ones and units are an interchangeable term.*	Continue to develop place value understanding through the use of manipulatives. • Place value arrow cards • Place value counters • Diennes Materials • Place value charts  	Continue to develop place value understanding through the use of manipulatives. • Place value arrow cards • Place value counters • Diennes Materials • Place value charts  	Continue to develop place value understanding through the use of manipulatives. • Place value arrow cards • Place value counters • Diennes Materials • Place value charts 

Redhill Primary School

Progression in the teaching of Addition

Foundation

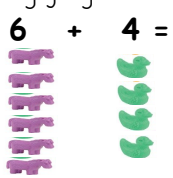
In Reception the children need plenty of practice of subitising. This is recognising numbers and quantities without having to count.

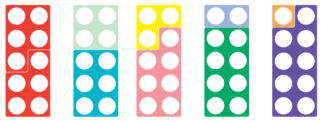
Initially this should be done with dots in patterns, such as on a dice or in arrays, working on numbers up to 5 and then 10.

We use Numicon resources to support this.

Once the children can recognise numbers presented as patterns, the dots can be presented in more random formats.

The children will learn about the concept of addition through practical activities, such as combining sets of animals, counters or Numicon, and will record these in a calculation. After they have combined groups matching number with quantity we move on to 'counting on' putting the biggest number in our head and then count on, initially using fingers to support.

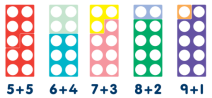




Year 1

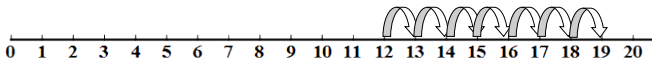
Year 1 children will continue to build on the skill of subitising.

Through use of Numicon and bead strings children become fluent in their bonds to 10 and for all numbers within 10. They will then develop an understanding of bonds to 20.



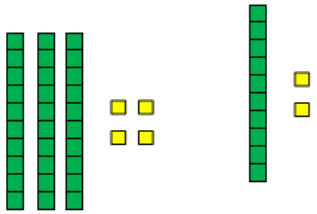
The children will build upon the 'counting on' method through the use of a number line.

12+7=19



As children progress to adding larger numbers the children are encouraged to use a more efficient method through the use of diennes materials.

34+12= 46



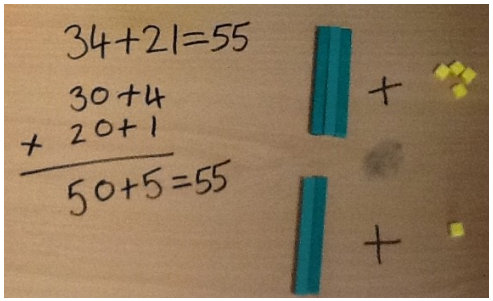
Some children may draw their own pictorial representations.

Year 2

Through use of Numicon and bead strings children become fluent in their bonds to 20 and develop an understanding of bonds to 100.

Children make use of their number bond knowledge and the counting on method when mentally adding together three unit numbers. Diennes and hundred squares are used to promote mental strategies when adding on units and multiples of 10.

Children will be introduced to the expanded column method for addition. It is imperative that the children are introduced to this with a concrete model initially. At first children will not cross boundaries.



When children are confident with the method they will cross boundaries.

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Redhill Primary School

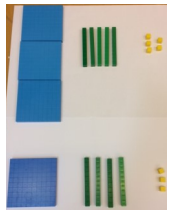
Progression in the teaching of Addition

Year 3

Children will continue to use the expanded column method for addition. Initially Diennes materials or place value counters can be used.

355 + 143

300 + 50 + 5
\+ 100 + 40 + 3
400 + 90 + 8 = 498



This should begin without crossing the next boundary (of 10, 100, 1000). Once children are secure with the method, they should use numbers which cross the boundaries.

355
\+ 143
8
90
400
498

With expanded methods, numbers can be added in either order (use of units first is most useful for moving children towards the more compact method when crossing the tens boundary and carrying the digit across)

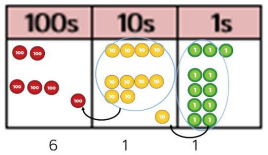
If children are unsure, revert back to the expanded methods of addition until they are ready to move on.

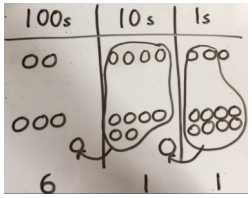
Year 4

In year 4 we expect the children to be able to make their workings for addition more efficient to involve the process of "carrying" digits in to the next column. This will involve both whole numbers and, where appropriate, decimal values.

243+368

243
\+ 368
611
1 1





Year 5

By year 5 the children should have a good grasp of the column method of addition using the process of "carrying" digits in to the next column.

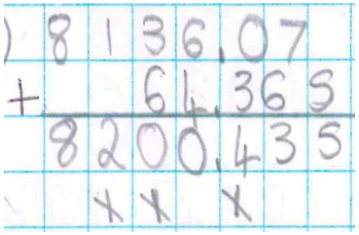
3587
\+ 2675
6262
1 1 1

This method can be used for decimal numbers as well as whole numbers. Children should be able to use numbers with different numbers of digits, lining up columns correctly, as well as for adding a series of numbers together.

Children should be able to make appropriate choices about which is the most efficient method to use: mental, jottings, written.

Year 6

By year 6 the children will have a good grasp of the column method of addition, working with whole numbers and decimal numbers. They will be able to use numbers with different numbers of digits, lining up columns correctly, as well as for adding a series of numbers.



Children should be able to make appropriate choices about which is the most efficient method to use: mental, jottings, written.

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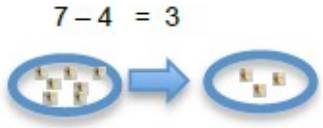
Redhill Primary School

Progression in the teaching of Subtraction

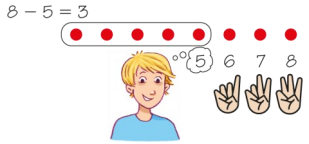
Foundation

In Reception children will tackle subtraction problems using vocabulary like, take away, subtract, minus and find the difference between.

Initially the children will solve subtraction through use of taking away an amount of objects. Children are taught to use their fingers, as well as practical equipment, for smaller subtraction sentences .



We then move on to counting back, putting the bigger number in our heads and counting back, initially supported by the use of fingers.

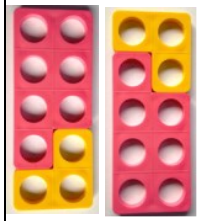


When children are confident with counting back we introduce 'finding the difference' counting on from the smaller number to find the difference.

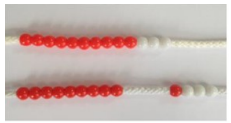
10 — 7 =

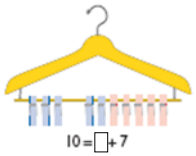
Year 1

Children will solve subtraction number sentences initially through use of taking away an amount of objects. Children will also be encouraged to use their fingers and practical equipment such as Numicon, bead strings, counters and multi-link. They will begin to recognise the inverse through developing their number bonds.



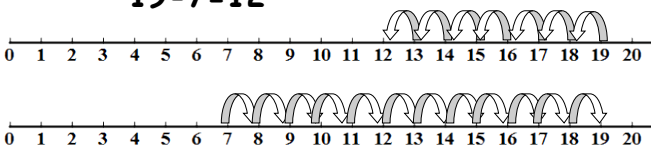
13-4=9





To extend their understanding, children will use laminated number lines to develop the concept of taking away (counting back) and finding the difference (counting on). Once again, these will be done practically rather than using written methods.

19-7=12

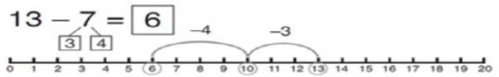


By the end of the year some children may be beginning to draw their own number lines.

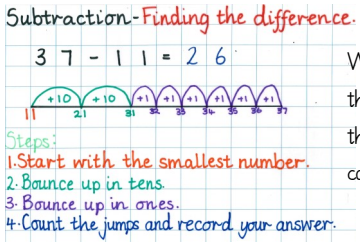
Year 2

Children are taught to subtract combinations of single digit and two digit numbers.

For taking away, children should put the bigger number in their heads and count back the smaller number. The children are encouraged to use bridging to cross the tens boundary using their number bonds knowledge.

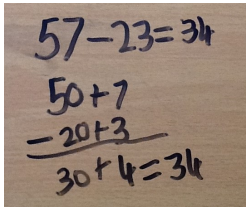


For finding the difference, children should start from the smaller number and count on to find the larger number.



When children are confident they are encouraged to refine their method by using more concise jumps e.g. +20, +6.

In the summer term children will be introduce to the expanded column method where the number sentence does not cross boundaries. This will be done with concrete apparatus.



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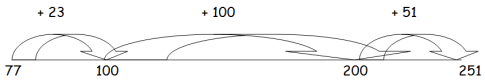
Redhill Primary School

Progression in the teaching of Subtraction

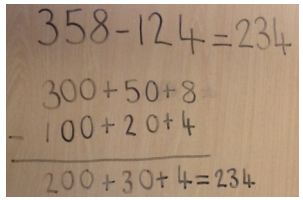
Year 3

Children will be encouraged to use the number line method, counting on from the smaller number, to support mental calculations.



251–77 = 174

The children will use a more formal method of subtraction for written calculations. This will only involve use of the **expanded method**.

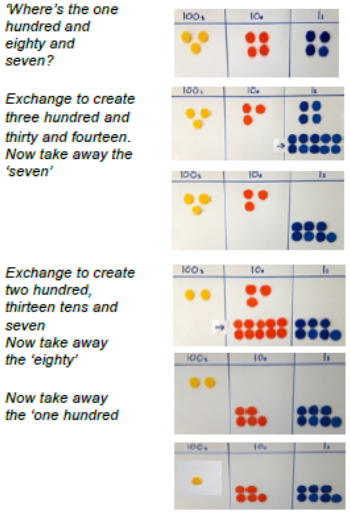


This should begin without crossing any boundaries.

Year 4

Children will To do this, children need to be able to partition numbers in to different ways. This is the process of exchanging.

344-187=157



200 130 14
~~300~~ ~~40~~ ~~4~~
- 100 80 7
100 50 7 = 157

They will refine the more expanded column method to the compact method.

71
~~7~~~~8~~4
- 256
528

784 - 256 = 528

Year 5

Children will use formal methods of subtraction with large numbers and decimal values, as well as extending to using numbers including zeros.

9
7 1 1
~~3~~~~8~~04
- 1256
2548

3804 - 1256 = 2548

Children should be able to make appropriate choices about which is the most efficient method to use: mental, jottings, written.

Year 6

Children should be able to use numbers with different numbers of digits, lining up columns correctly, as well as working with numbers including zero digits.

37.8 – 14.671 =

7 9
3 7.~~8~~ ~~0~~10
1 4.6 7 1
2 3.1 2 9

Children should be able to make appropriate choices about which is the most efficient method to use: mental, jottings, written.

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Redhill Primary School

Progression in the teaching of Multiplication

Foundation

In Reception children are taught about doubling through addition. Adding the same number again.

Double 3 is 3+3 = 6

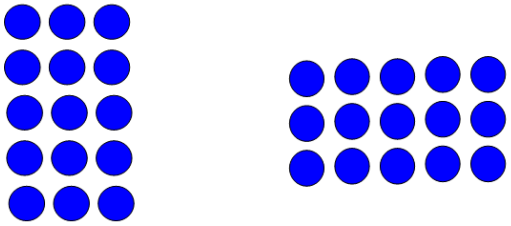
Initially this will be supported with models and images and in time would be instant recall of number facts.

Year 1

In Year 1 children are shown that repeated addition can be represented as multiplication.

5 + 5 + 5 = 3 x 5

This is then shown as an array—a visual representation of the number sentence.



Year 2

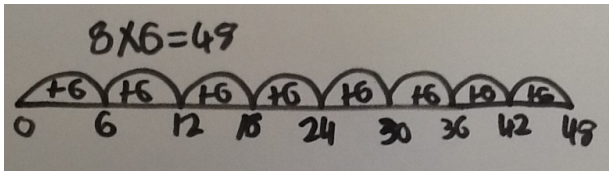
In Year 2 multiplication is shown visually through the use of arrays. This supports their understanding of the concept of repeated addition, met in earlier years.

3 x 4

(3 lots of 4) **(4 lots of 3)**

Presenting this image in both ways helps children to understand multiplication can be done in either order, an important concept when they are learning times-tables.

Multiplication can also be shown on a number line, by counting in "lots of" or "groups of". This links to work on division later on.



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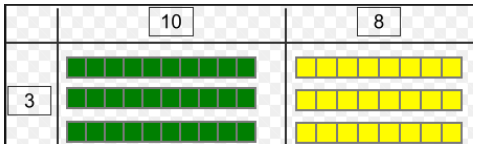
Progression in the teaching of Multiplication

Year 3

In year 3, children are encouraged to use the grid method to solve multiplication questions which involve larger numbers. This involves partitioning the numbers and multiplying each part together.

18 x 3



This will be introduced through models and images, before using the written format.

For example:

24 x 4

x	20	4
4	80	16

80 + 16 = 96

24 x 4 = 96

Year 4

In Year 4 the children are initially encouraged to use the grid method to solve multiplication questions involving larger numbers. This may include HTU x U.

324x7=2268

X	300	20	4
7	2100	140	28

=2268

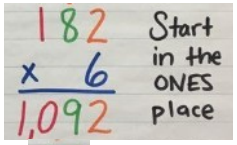
The children will then adopt the expanded column method.

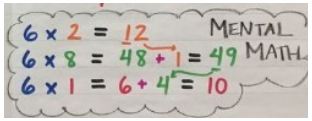
231 x 7

231
x 7
7 (7 x 1)
210 (7 x 30)
1400 (7x200)
1617

31 x 22 = 1617

By the end of the year the children will be using the compact method. This will be supported through concrete materials initially.





Year 5

By the end of Year 5 children will be expected to be able to multiply a 4-digit number by a 1-digit number using the compact method.

The children will build upon the compact method to include multiplying by 2-digit numbers.

34
x 47
238 (7x34)
1360 (40x34)
1598

34x47 = 1,598

Children will be expected to multiply a 3-digit number by a 2-digit number.

Year 6

By the end of Year 6 the children will be expected to multiply a 4-digit number by a 2-digit number.

They also need to be able to multiply one digit number with up to 2d.p. by whole numbers.

2.43
x 7
17.01
3 2

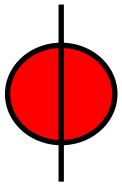
Redhill Primary School

Progression in the teaching of Division

Foundation

Children are introduced to the concept of division by halving.

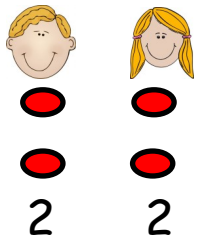
When halving we encourage the children to share between 2 . We begin using shapes or real objects to show that when something is halved you have 2 parts.



We emphasise the importance of it being equal and that each half must be exactly the same.

We then develop this into halving a number or a quantity through sharing between 2. 'One for me, one for you'.

Half of 4=2



We encourage the children to use language such as and equal. For example they both have the same amount so half of 4 must be 2.

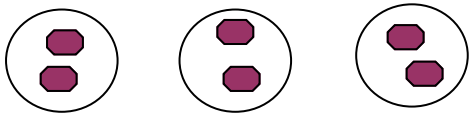
Year 1

In Year 1 children are taught about division through practical work and activities . . .

Sharing

'one for you, one for you, one for you'

6 ÷ 3

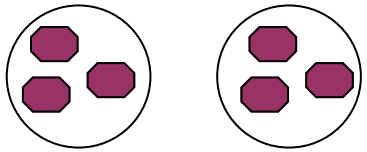


Grouping

'how many groups of . . . ?'

6 ÷ 3

How many groups of 3?

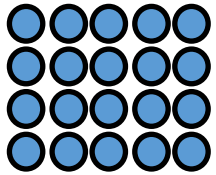


Year 2

In Year 2 the children are taught division in two ways:

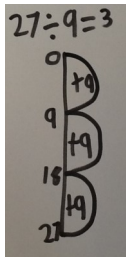
Through the use of an array

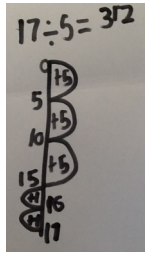
20÷5=4



This supports the concept of multiplication and division as inverse operations.

Through the use of a number line:





When the children are confident with this method they will be given number sentences which will result in remainders.

Tests of divisibility will be taught to improve decision making. In Year 2 this will be done with the 2, 5 and 10 times tables.

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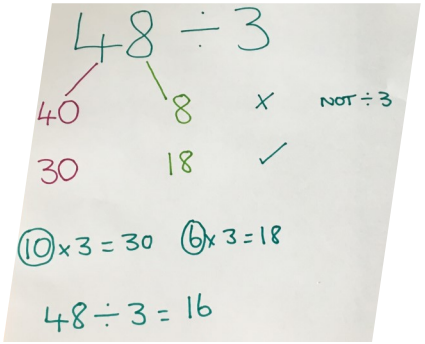
Progression in the teaching of Division

Year 3

In Year 3 the children will be re-arranging the dividend as an introduction to written division.



This should be done initially with whole number answers but by the end of the year children should be confident with calculations involving remainders.

Remainders will be taught in the context of problem solving.

Tests of divisibility will be taught to improve decision making. In Year 3 this will be done with the 3 and 6 times tables.

Year 4

In Year 4 the children will use the short division method.

372 ÷ 9

9 | 372

How many 9s are there in 3?

0
9 | 372
37

0, so we carry it across

How many 9s are there in 37?

04
9 | 372
12

4 R1, so we carry the 1 across

How many 9s are there in 12?

041 r 3
9 | 372

1 R3, so the 3 is left over

372 ÷ 9 = 41 r 3

Remainders will be taught in the context of problem solving.

Tests of divisibility will be taught to improve decision making. In Year 4 this will be done with the 4 and 9 times tables.

Year 5

Children will continue to use the short division method, working with 4 digit numbers and a unit divisor. This will include using remainders and making decisions about whether to round up or down in context.

362 ÷ 7 =

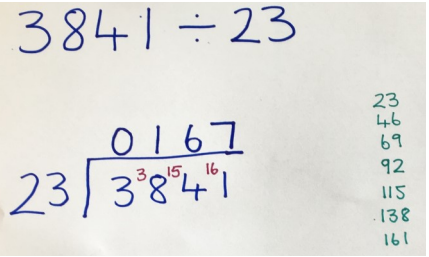
5 1 r5
7 | 3 6 1 2

362 ÷ 7 = 51 r5

In Year 5 children will use tests of divisibility to support mental methods.

Year 6

In Year 6 the children will use the compact method to divide numbers up to 4-digits by a 2-digit divisor. Children should record the multiples of the divisor alongside the written method for efficiency.



The children will be expected to use written division methods in cases where the answer has up to two decimal places

34.2 ÷ 6

6 | 34.2

How many 6s are there in 3?

0
6 | 34.2
34

How many 6s are there in 34?

05.
6 | 34.2
42

How many 6s are there in 42?

05.7
6 | 34.2

34.2 ÷ 6 = 5.7

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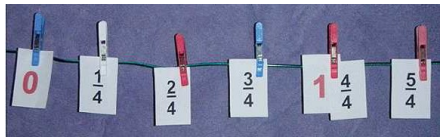
Progression in the teaching of Fraction Calculations (addition and subtraction)

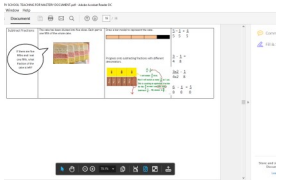
Year 3

Add and subtract fractions with the same denominator within one whole:

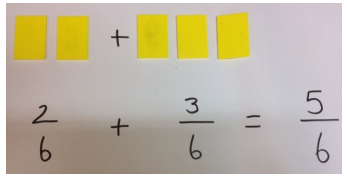
* count in fraction steps using real objects and a number line



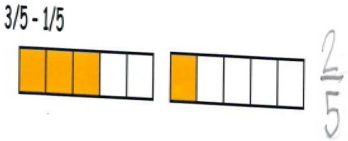
* using real life contexts



* add simple fractions with practical materials



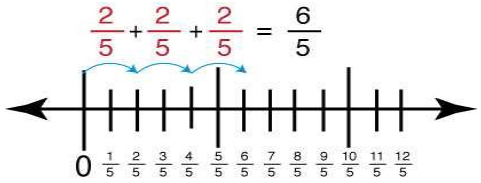
* use images to supporting adding and subtracting



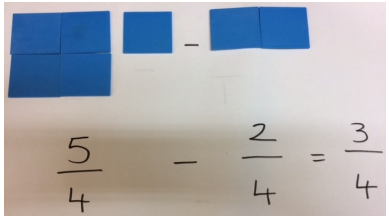
Year 4

Add and subtract fractions with the same denominator:

* count in steps on a number line



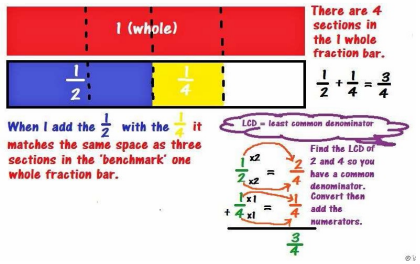
* use practical resources



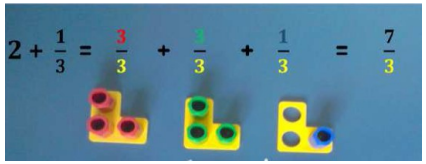
Year 5

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

* use fraction walls to explore equivalent fractions



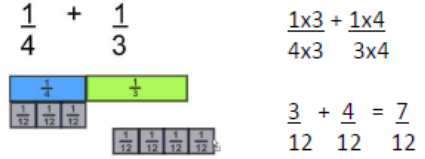
* use Numicon to add/subtract fractions



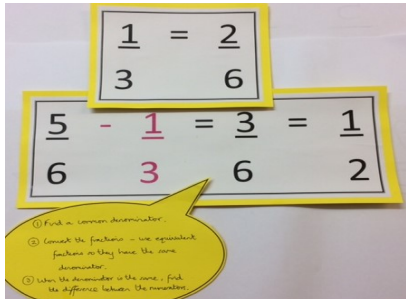
Year 6

Add and subtract fractions with different denominators and mixed numbers:

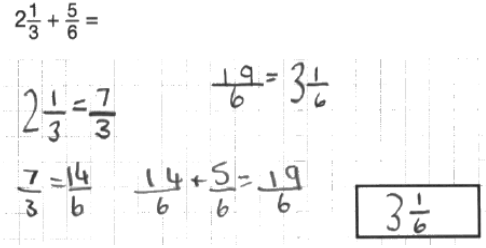
* use the bar model to add and subtract fractions



* use common denominators



* use mixed numbers or improper fractions



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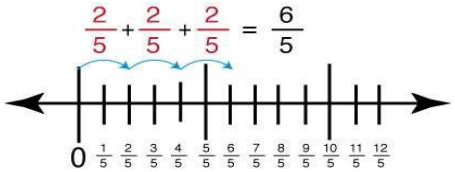
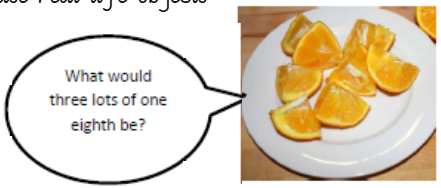
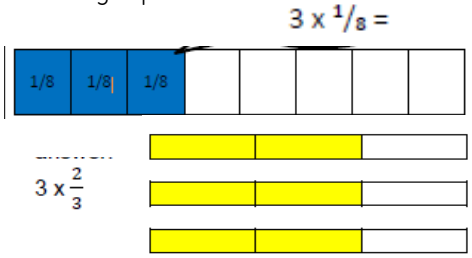
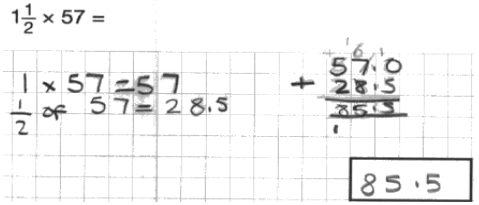
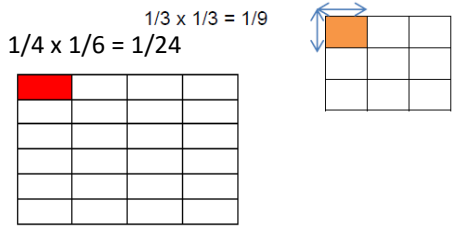
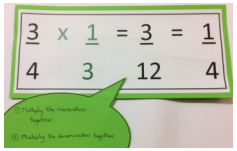
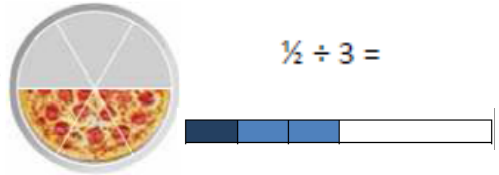
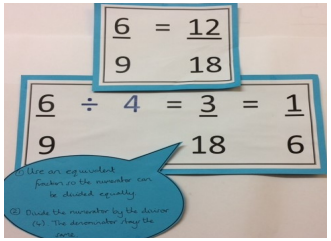
Progression in the teaching of Fraction Calculations (multiplication and division)

Year 3	Year 4	Year 5	Year 6
		Multiply proper fractions and mixed numbers by whole numbers (supported by materials and diagrams) * count in fraction steps (repeated addition)  * use real life objects  * use images/pictures  * use mixed numbers  	**Multiply simple pairs of proper fractions, writing the answer in the simplest form:** * use images/pictures  * use numbers  **Divide proper fractions by whole numbers:** * use images/objects  * use numbers 

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