Curbar Primary School

Calculation Policy

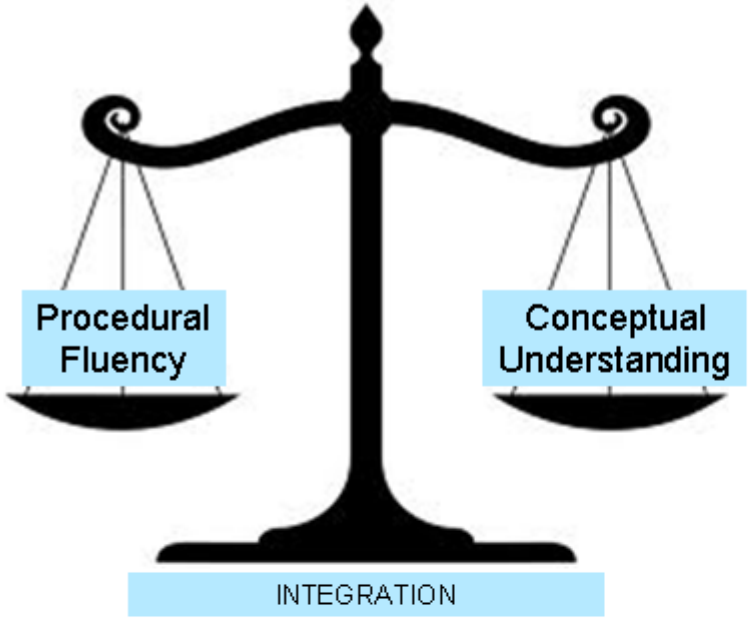
(Jan 2023)

Curbar Primary School

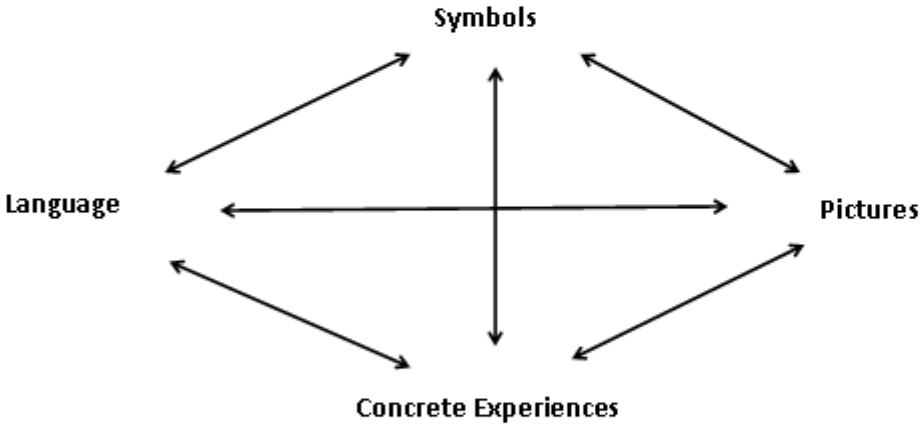
Happy learners forging our place in the world

Aims:

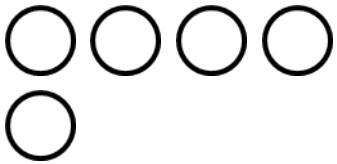
Developing procedural fluency and conceptual understanding in parallel, through using concrete, pictorial and symbolic representations and making connection between them.



Haylock and Cockburn (2008)



Addition and Subtraction

EYFS Calculations Policy Development Matters Band: 22-36 Months			
Addition	**Subtraction**	**Multiplication**	**Division**
Objectives: Selects a small number of objects from a group when asked, for example, 'please give me one', 'please give me two'. Recites some number names in order. Uses some language of quantities, such as 'more' and 'a lot'. Begins to make comparisons between quantities. Creates and experiments with symbols and marks representing ideas of numbers. Knows that a group of things change in quantity when something is added or taken away.			
Vocabulary: Number names, count, number, forwards, more, add, lots, some, altogether	**Vocabulary:** Take away, backwards, less, left	**Vocabulary:**	**Vocabulary:**
Use of role play and environment. Practical activities using addition Songs and rhymes.  Practical activities as above but beginning to use number tracks as models to support understanding.	Number rhymes and songs with actions. Use of practical resources to illustrate the song E.g. 5 currant buns in the bakers shop….. And took it right away   		

EYFS Calculations Policy

Development Matters Band: 30-50 Months

Addition

Subtraction

Objectives:

- Uses some number names and number language spontaneously.
- Uses some number names accurately in play.
- Recites numbers in order to 10.
- Knows that numbers identify how many objects are in a set.
- Beginning to represent numbers using fingers, marks on paper or pictures.
- Sometimes matches numeral and quantity correctly.
- Shows curiosity about numbers by offering comments or asking questions.
- Compares two groups of objects, saying when they have the same number.
- Shows an interest in number problems.
- Separates a group of three or four objects in different ways, beginning to recognise that the total is still the same.
- Shows an interest in numerals in the environment.
- Shows an interest in representing numbers.
- Realises not only objects, but anything can be counted, including steps, claps or jumps.

Vocabulary: Number names to 10,add, How many, lots, some, most, add, more, forwards, count

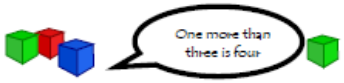
Vocabulary: Take away, backwards, least, less, left

Recognise numbers 1- 10

Spot numbers in the environment

Count up to 10 objects reliably

Conservation



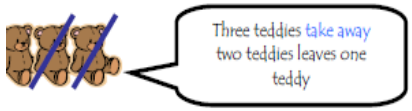
Find one more than a number

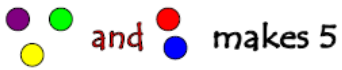
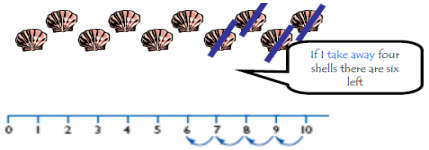
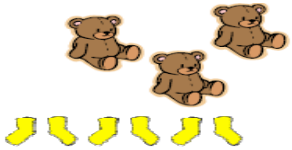
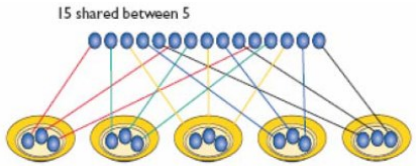
Recording numbers using pictures or use apparatus, such as Numicon to show this.

Continue to count back in ones from any given number

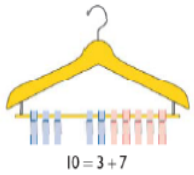
Remove some objects and count

Begin to relate subtraction to taking away

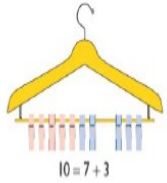


EYFS Calculations Policy	Development Matters Band: 40-60 months and ELG		
Addition	**Subtraction**	**Multiplication**	**Division**
Objectives: Recognise some numerals of personal significance. • Recognises numerals 1 to 5. • Counts up to three or four objects by saying one number name for each item. • Counts actions or objects which cannot be moved. • Counts objects to 10, and beginning to count beyond 10. • Counts out up to six objects from a larger group. • Selects the correct numeral to represent 1 to 5, then 1 to 10 objects. • Counts an irregular arrangement of up to ten objects. • Estimates how many objects they can see and checks by counting them. • Uses the language of 'more' and 'fewer' to compare two sets of objects. • Finds the total number of items in two groups by counting all of them. • Says the number that is one more than a given number. • Finds one more or one less from a group of up to five objects, then ten objects. • In practical activities and discussion, beginning to use the vocabulary involved in adding and subtracting. • Records, using marks that they can interpret and explain. • Begins to identify own mathematical problems based on own interests and fascinations. **Early Learning Goal** **Children count reliably with numbers from one to 20, place them in order and say which number is one more or one less than a given number. Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer.**		**Objectives:** **Early Learning Goal** **They solve problems, including doubling, halving and sharing.**	
Vocabulary: More than, enough, count on, lots of, bigger ,most, addition, add on, plus, forwards, before, total, higher, up	**Vocabulary:** Less than, fewer, least, enough, count back, smaller, take away, difference, before, down, backwards, lower	**Vocabulary:** Double, lots of, groups, equal	**Vocabulary:** Share, halve, groups of
Begin to relate addition to combining groups of numbers  Demonstrate their knowledge of addition by combining numicon shapes and say what they have done using the appropriate vocabulary.	Count backwards along a number line to ' take away'  Use Numicon to support subtraction. Place a small piece over a larger piece to see what is left and visualise the connection between addition and subtraction.	Role play/small world / story telling etc , find pairs of. e.g. How many socks will we need for the three bears?  Experience of equal groups of objects, count in 2s, 5s and 10s. Work on practical problem solving activities involving equal sets or groups.	Sorting objects into groups e.g. We have got 4 biscuits how can we share them out equally (fairly) between the two of us?  '

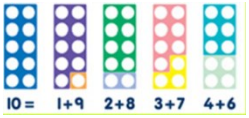
Start to recognise that addition can be done in any order



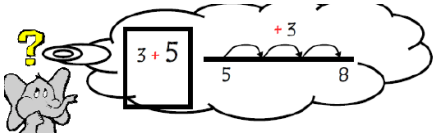
5 plus 3 = 8
3 more than 5 =8



Use Numicon to help with number facts



Put the biggest number first and count on

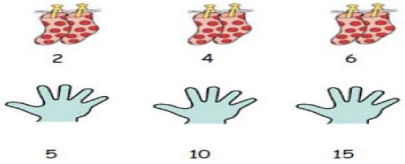


Begin to use the + and = signs to record calculations in a number sentence using practical apparatus for support.

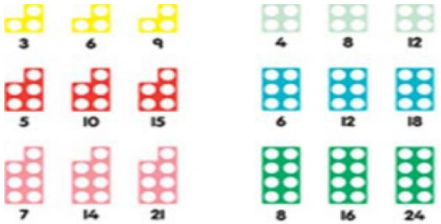
8 + 7 = 15

Begin to use the – and = signs to record calculations in a number sentence, using practical apparatus for support.

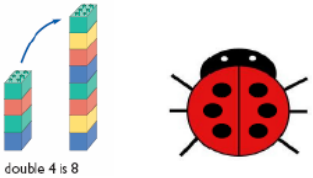
6 – 4 = 2



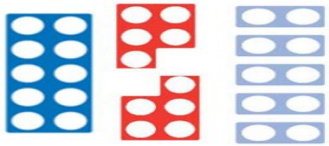
Use Numicon to help the children to visualise the grouping of numbers and to support counting on as repeated addition.



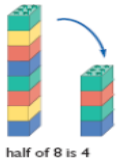
Know number doubles to 10

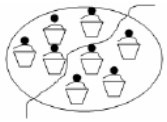


Numicon used to find how many smaller numicon pieces fit over a larger piece. e.g. 5, 2's will fit over a 10 piece.



Know number halves to 10





Addition

Year 1

Objectives: add and subtract one digit and two digit numbers within 20, including 0. Use the + and – signs.

Vocabulary: add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, number line

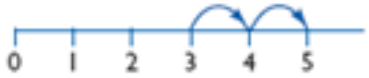
Subtraction

To put the biggest number first and count on.

To add two single digit numbers that bridge 10.

- Count along a number line to add numbers together

3 + 2 = 5



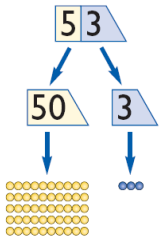
To begin to partition numbers in different ways e.g.,

50 = 40 + 13

Record as a number sentence both linear and columnar

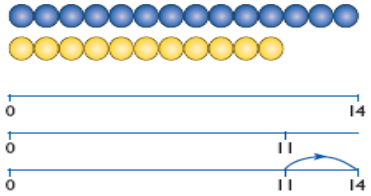
E.g. 10 = 7 + 3

7 + 3 = 10



To subtract single digit numbers often bridging

Begin to find the difference by counting up from the smallest number.



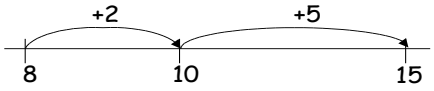
The difference between 11 and 14 is 3.

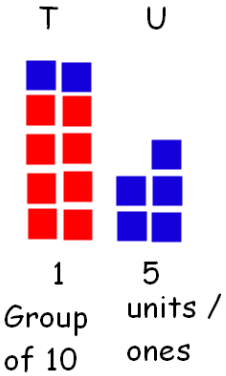
14 – 11 = 3

11 + ☐ = 14

My End of Year Method

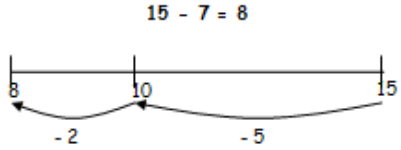
8 + 7 = 15





Methods for both addition and subtraction mirror a practical process. The written method should represent a practical procedure and record the steps taken to remove value. E.g. 15-7=8; 15 balls (arranged as 10 and 5) where 5 is removed and recorded, then 2 is removed and the remaining 8 regrouped into the ten

My End of Year Method



Addition

Year 2

Subtraction

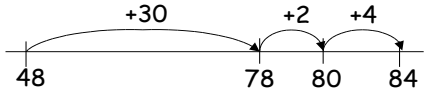
Objectives: add and subtract two 2 digit numbers and three 1 digit numbers. Add and subtract a two digit number and ones and a two digit number and tens. Show that addition can be done in any order and subtraction of one number from another cannot. Recognise and use the inverse relationship between addition and subtraction.

Vocabulary: add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, number line, sum, tens, units, partition, addition, column, tens boundary

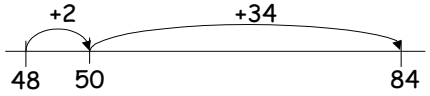
Horizontal addition two digit and single digit number

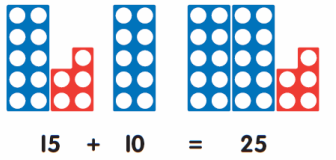
24 + 8 = 32

To add two 2 digit numbers (bridging through the tens boundary) using a numberline



48 + 36 = 84





48 + 36 = 84

40 + 30 = 70
8 + 6 = 14
70 + 40 = 84

My End of Year Method

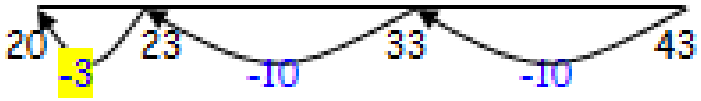
These methods should be taught alongside each other . The written procedure should reflect practical fluency

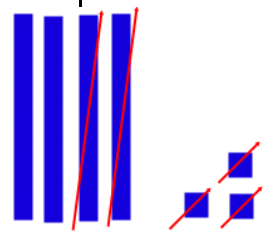
Partition the number to be subtract

No regrouping

43 – 20 = 23

23 – 3 = 20

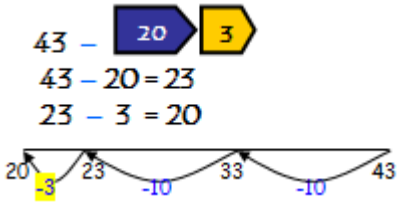




2 Groups of 10

0 ones/ units

My End of Year Method



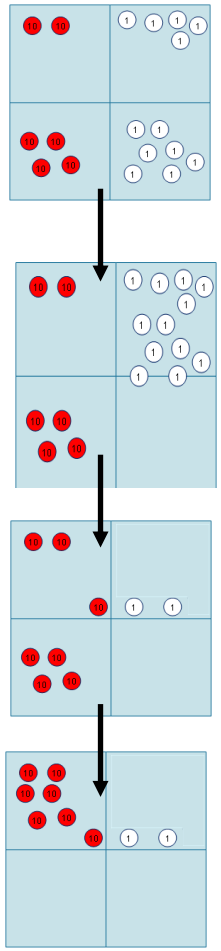
Addition

Year 3

Subtrac-

Objective: Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction

vocabulary: add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, number line, sum, tens, units, partition, plus, addition, column, tens boundary, **hundreds boundary, increase, vertical, exchanging, expanded, compact**



25
+47

25
+47

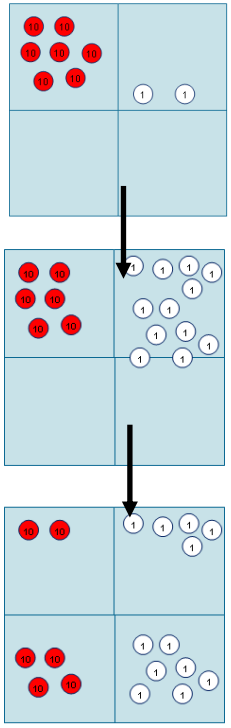
25
+47
2

25
+47
72

End of Year Method

789 + 642 becomes

```
  7 8 9
+ 6 4 2
-------
1 4 3 1
  1 1
```



72
-47

72
-47

72
-47
25

Children will also become familiar with the bar model and part-whole model to aid in the visual representation of addition and subtraction.

End of Year Method

874 - 523 becomes

```
  8 7 4
- 5 2 3
-------
  3 5 1
```

932 - 457 becomes

```
  8 12 1
  9 3  2
- 4 5  7
-------
  4 7  5
```

Addition

Year 4

Subtrac-

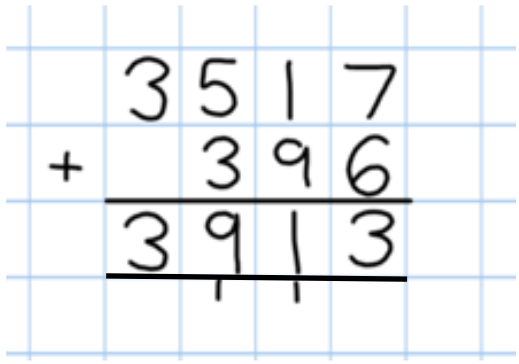
Objective: add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate

Vocabulary: add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, number line, sum, tens, units, partition, plus, addition, column, tens boundary, hundreds boundary, increase, vertical, **exchanging**, expanded, compact, **thousands, hundreds, digits, inverse**

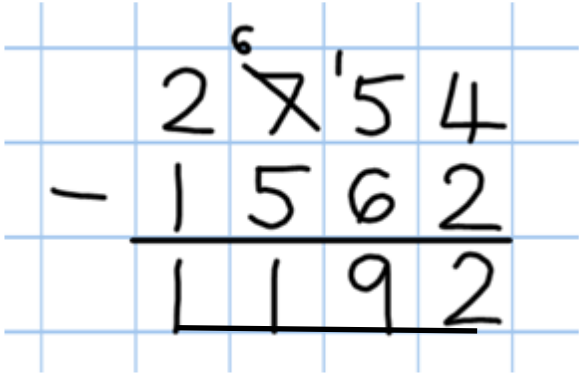
Children to continue to use resources and grids to support calculation.

(*See Year 3)

End of Year Method



End of Year Method



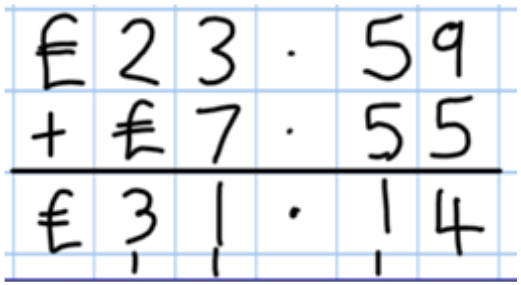
Addition

Year 5

Objectives: Add and subtract whole numbers with more than 4 digits

Vocabulary: add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, number line, sum, tens, units, partition, plus, addition, column, tens boundary, hundreds boundary, increase, vertical, **exchanging**, expanded, compact, vertical, thousands, hundreds, digits, inverse and **decimal places, decimal point, tenths, hundredths, thousandths**

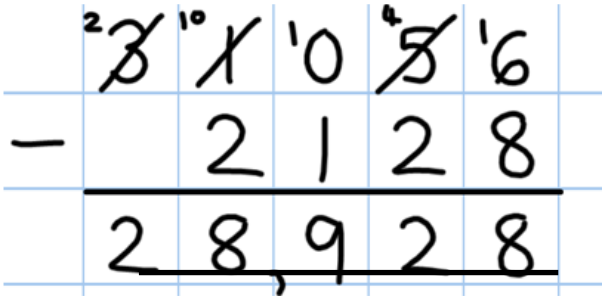
Subtraction



Numbers should exceed 4 digits

Decimal point should stay aligned throughout

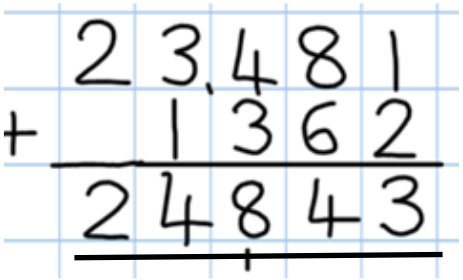
Compact column subtraction with 'exchanging'



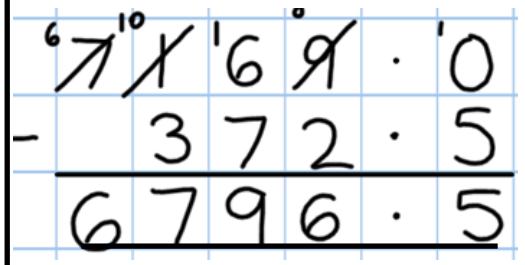
Multi-step word problems in contexts

Rounding to check answers

My End of Year Method



My End of Year Method



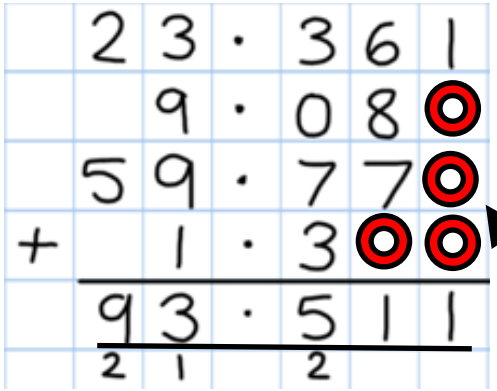
Addition

Year 6

Objectives: Add and subtract whole numbers with more than 4 digits

Vocabulary: add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, number line, sum, tens, units, partition, plus, addition, column, tens boundary, hundreds boundary, increase, vertical, **exchanging**, expanded, compact, vertical, thousands, hundreds, digits, inverse and decimal places, decimal point, tenths, hundredths, thousandths

Subtraction

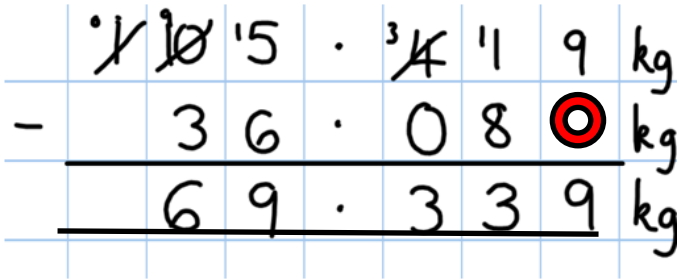


Numbers should exceed 4 digits

Decimal point should stay aligned throughout

Insert zeros into empty columns

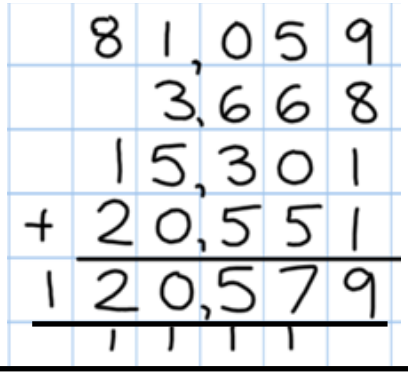
Compact column subtraction with 'exchanging'



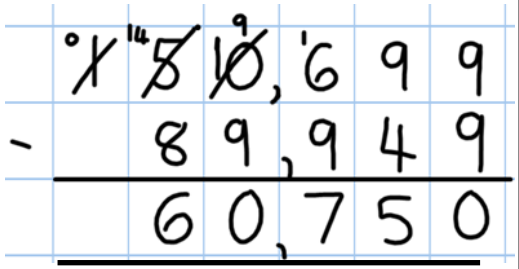
Multi-step word problems in contexts

Estimating and rounding to check answers

My End of Year Method



My End of Year Method



Multiplication and Division

Multiplication

Year 1

Objectives: solve one step problems involving multiplication and division by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher. Count in 2,5 and 10s.

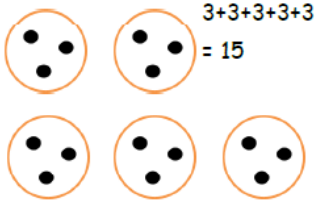
Vocabulary: groups of, lots of, times, array, altogether, multiply, count

Division

How many legs will 3 teddies have?

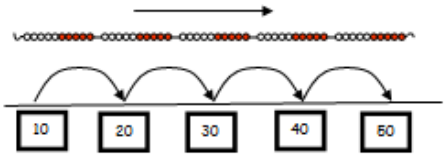
2 + 2 + 2 = 6

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

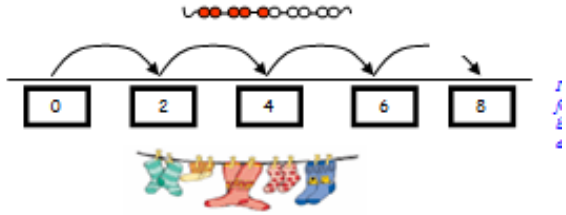


3+3+3+3+3
= 15

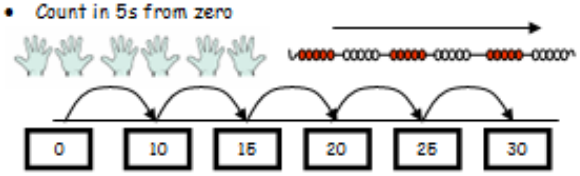
- Count on in tens



- Count in twos from zero

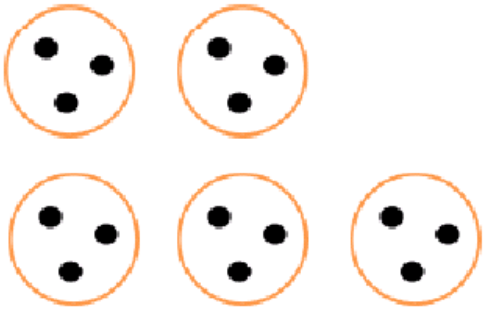


- Count in 5s from zero



4x3= 4 multiplied by 3 = 4+4+4

3x4= 3 multiplied by 4 = 3+3+3+3



Division mat—sharing.

A group of objects shared equally between a predetermined set of groups.

Some children may be able to record as and solve from:

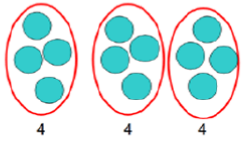
15÷5=3

- Trough role play/general play situations find pairs of.
  e.g. How many socks will we need for the three bears?
- Sorting objects into groups
  e.g. We have got 4 biscuits how can we share them out equally (fairly) between the two of us?
- Playing pairs game i.e snap, pairs

How many groups of 4 can be made with 12 stars? = 3

Grouping:

Sharing:



12 shared between 3 is 4

Example division problem in a familiar context:

There are 6 pupils on this table and there are 18 pieces of fruit to share between us. If we share them equally, how many will we each get?

Can they work it out and give a division statement… ?

"18 shared between 6 people gives you 3 each."

Multiplication

Year 2

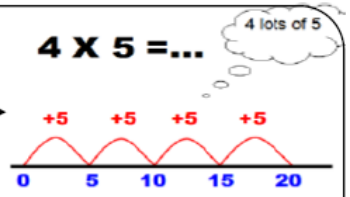
Division

Objectives: recall and use multiplication and division facts for the 2,5 and 10 multiplication tables, calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication, division and equals symbols, solve problem involving multiplication and division using materials, arrays, repeated addition, mental methods, multiplication and division facts.. Count in 3,4 and 8s.

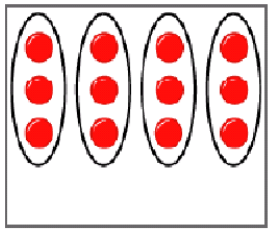
Vocabulary: groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, times as big as, once, twice, three times...

Use repeated addition on a number line:

- Starting from zero, make equal jumps up on a number line to work out multiplication facts and write multiplication statements using x and = signs.



Arrays:



This represents 12÷4=3
12 counters shared equally into 4 groups
Pupils should also know that 12counters shared into groups of 4will produce 3 groups of 4 counters.

Use arrays:

5 x 3 = 15

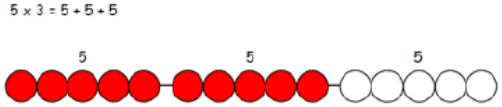
3 x 5 = 15

5 x 3 = 3 + 3 + 3 + 3 + 5 = 15

3 x 5 = 5 + 5 + 5 = 15

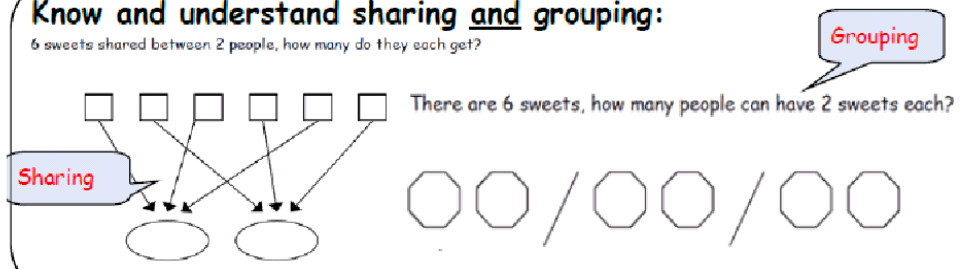
Use arrays to help teach children to understand the commutative law of multiplication, and give examples such as 3 x __ = 6.

Use practical apparatus:



Know and understand sharing and grouping:

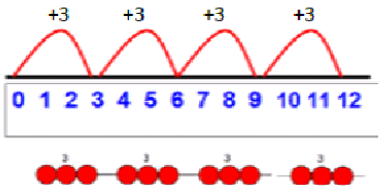
6 sweets shared between 2 people, how many do they each get?



Children should be taught to recognise whether problems require sharing or grouping.

Grouping using a number line:

Group from zero in equal jumps of the divisor to find out 'how many groups of _ in _ ?'. Pupils could and using a bead string or practical apparatus to work out problems like 'A CD costs £3. How many CDs can I buy with £12?' **This is an important method to develop understanding of division as grouping.**



12 divided by ? = 3

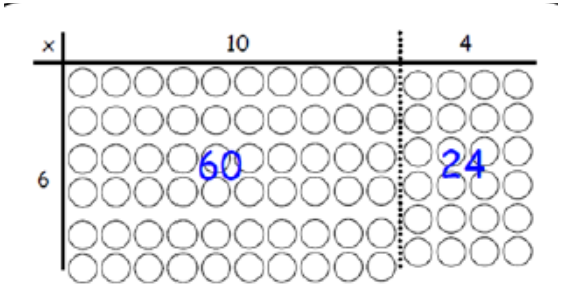
Multiplication

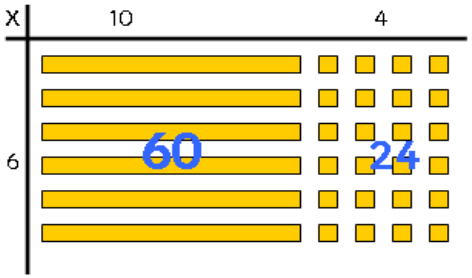
Year 3

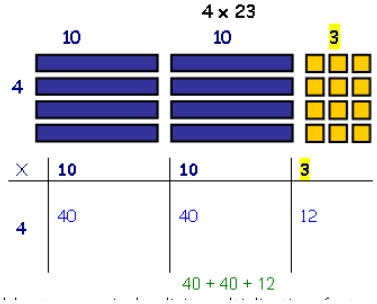
Division

Objective: Write and calculate mathematical statements for multiplication and division using the multiplication tables they know, including for two-digit numbers times one digit numbers, using mental and progressing to formal written methods.

Vocabulary: groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, times, times as big as, once, twice, three times..., **partition, grid method, multiple, product, tens, units, value exchanging**

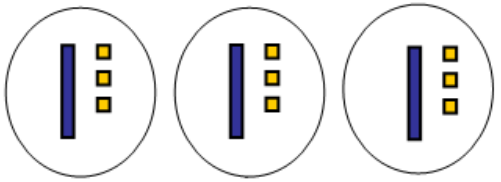




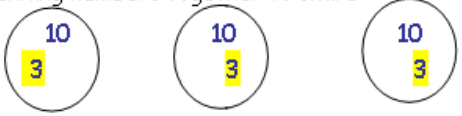


- Using chunking as an efficient way of sharing (using place value apparatus to share)

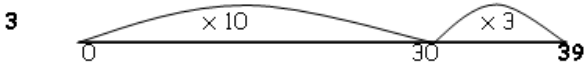
eg 39 ÷ 3 = 13



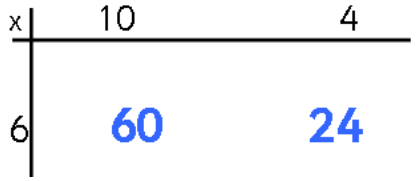
- Chunking numbers together to share

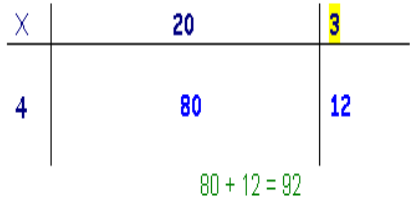


- Begin to chunk in larger chunks on a number line

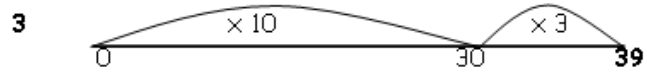


End of Year Method





End of Year Method



Sharing **39÷3 =**

30÷3=10

9÷3= 3 10+3=13

Multiplication

Year 4

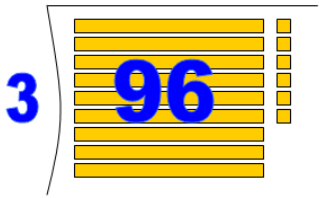
Division

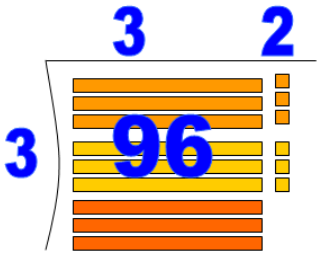
Objective: Multiply two and three digit numbers by a one digit number using formal written layout.

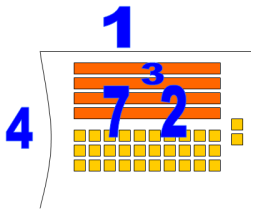
Pupils practice to become fluent in the formal written method of **short multiplication** and for multiplying an short division with exact answers when dividing by a 1 digit number.

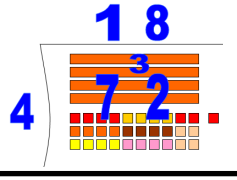
Vocabulary: groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, array, column, row, commutative, groups of, sets of, lots of, equal groups, times, multiply, times as big as, once, twice, three times... partition, grid method, total, multiple, product, sets of, inverse **exchanging**

x	10	4
6	60	24





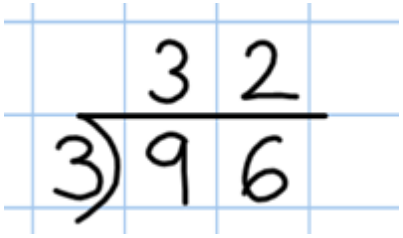


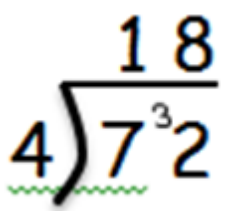


End of Year Method

14
X6
24
60
84

End of Year Method





Multiplication

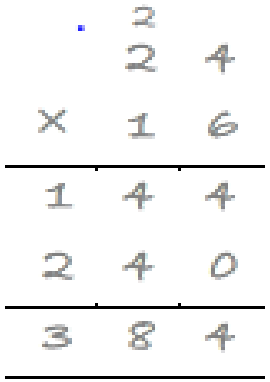
Year 5

Division

Objectives: Multiply up to 4-digits by 1 or 2 digits.

Divide up to 4 digits by a single digit, including those with remainders.

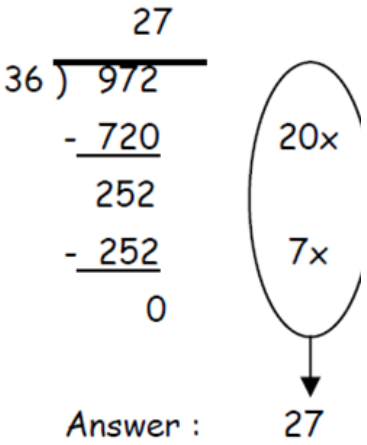
Vocabulary: groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, array, column, row, commutative, sets of, equal groups, times as big as, once, twice, three times... partition, grid method, total, multiple, product, inverse, square, factor, integer, decimal,



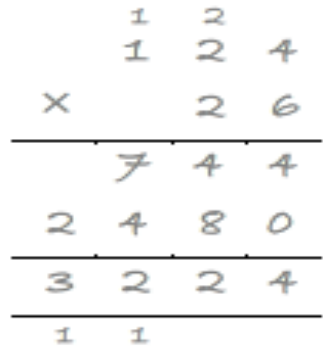
Multi-step word problems in contexts

Estimating and rounding to check answers

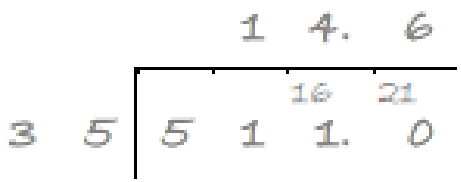
Interpret remainders in context



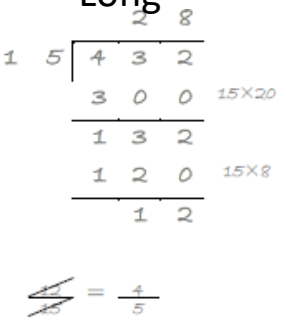
My End of Year Method



My End of Year Method—Short



My End of Year Method—Long

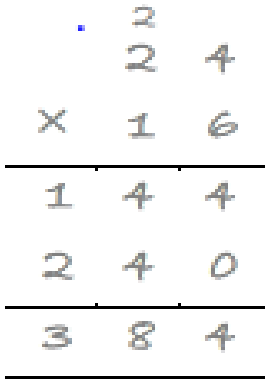


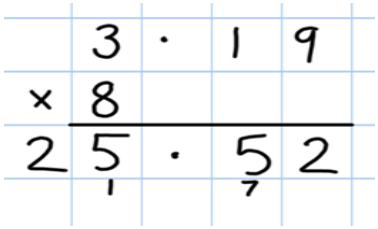
Year 6

Objectives: Multiply decimals with up to 2d.p by a single digit.

Divide at least 4 digits by both single-digit and 2-digit numbers

Vocabulary: groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated ad-dition, array, column, row, commutative, sets of, equal groups, times as big as, once, twice, three times... partition, grid meth-od, total, multiple, product, inverse, square, factor, integer, decimal, short / long multiplication, **tenths, hun-dredths, decimal exchanging**

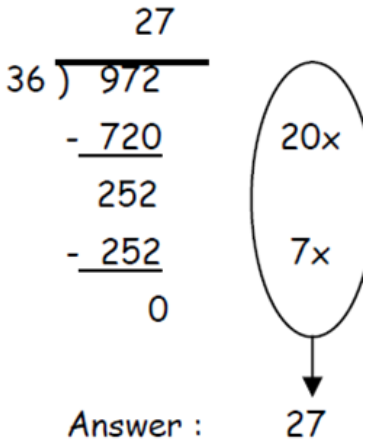




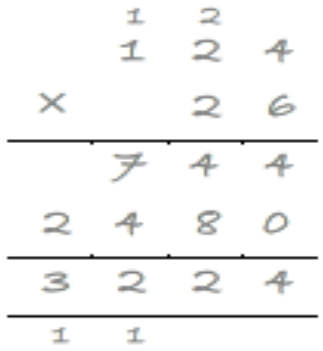
Multi-step word problems in contexts

Estimating and rounding to check answers Interpret re-mainders in context

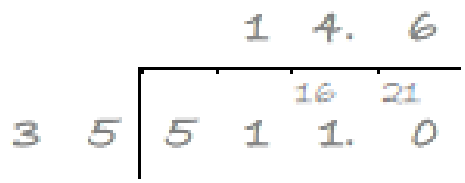
Children working at greater depth will experience multiplication and division problems involving deci-mals.



My End of Year Method



My End of Year Method— Short



My End of Year Method— Long