Oak Lodge Primary School

Progression in Calculation

What you need to know about calculations

Mathematics will be at the core of your child's schooling from the moment they start to the moment they leave. They will be involved in drawing, measuring, handling data and lots of other practical activities that will help your child to understand and enjoy the subject. This booklet offers guidance to the methods used to help our pupils with calculations. The methods we are advocating are in line with the new National Curriculum (from September 2014). We hope this will be helpful to you and that you will be able to support your child in learning by heart the basic rules which will assist in mental recall eg. number bonds and multiplication tables.

The methods that we use in school may or may not be familiar to you. Children are often confused when they ask parents for help at home and they try to teach the methods that they themselves were taught. Knowing how the methods in this booklet work will help you to help your children.
All staff in school work from this document so that we can ensure the consistency of our approach and can make sure that the children move onto the next step when they are ready.

The four operations that are covered by this booklet are addition, subtraction, multiplication and division. Whichever operation is being taught the child needs to experience all of these steps to completely conquer it.
1) using objects
2) using pictures
3) using a numberline
4) using an expanded method
5) using a compact written method

Mental methods first

Children should always be encouraged to consider if a mental calculation would be appropriate before using written methods. These are covered in the first part of each section.

Why do children need to do written calculations?

- To represent work that has been done practically
- To support, record and explain mental calculation
- To keep track of steps in a longer task
- To work out calculations that are too difficult to do mentally

Children should be taught when it is appropriate to do an approximate or estimate first and should check with the inverse operation at the end.

By upper Key Stage 2, children should be confident in choosing and using a strategy that they know will get them to the correct answer as efficiently as possible.

What can you do to help?

- Count with your child
- Play number games
- Involve your child when taking measurements or weighing items
- Take note of numbers in real life e.g. telephone numbers, bus numbers, lottery numbers etc.
- Provide opportunities to use money to shop, check change etc.
- Talking about the mathematics in football e.g. 'How many points does your favourite team need to catch the next team in the league?'
- When supporting in calculation, use the method that they have been taught

Please don't…

- Teach your children that to multiply by 10 you 'just add a zero'. – you 'move the digits to the left and add a zero as a place holder'
- Tell them that you can move the decimal point. – You can't. You can only move the digits to the left or to the right
- Tell them that they are doing 'sums' – 'sum' is a mathematical word that means 'addition', everything else is a 'calculation'

Glossary

2-digit – a number with 2 digits like 23, 45, 12 or 60
3-digit – a number with 3 digits like 123, 542, 903 or 561
Addition facts – knowing that 1+1 = 2 and 1+3 = 4 and 2+5 = 7. Normally we only talk about number facts with totals of 20 and under
Array -An array is an arrangement of a set of numbers or objects in rows and columns –it is mostly used to show how you can group objects for repeated addition or subtraction
Bridge to ten – a strategy when using numberlines. Adding a number that takes you to the next 'tens' number
Short Division – also known as the 'Bus Stop Method' - a traditional method for division with a single digit or simple 2-digit divisor
Concrete apparatus – objects to help children count – these are most often cubes (multilink) but can be anything they can hold and move Dienes (purple hundreds, tens and units blocks), Numicon, Cuisenaire rods are also referred to as **concrete apparatus**
Column chunking – method of division involving taking chunks or groups or the divisor away from the larger number
Decimal number – a number with a decimal point
Divisor – the number you are dividing by in a division calculation; the number in each group for chunking
Double – multiply a number by 2
Exchanging – Moving a 'ten' or a 'hundred' from its column into the next column and splitting it up into ten 'ones' (or 'units') or ten 'tens' and putting it into a different column
Expanded Multiplication – a method for multiplication where each stage is written down and then added up at the end in a column
Find the difference – A method for subtraction involving counting up from the smaller to the larger number
Grid method – a method for multiplying two numbers together involving partitioning
Half - a number, shape or quantity divided into 2 equal parts
Halve – divide a number by 2
Integer - a whole number (with no decimal point)
Inverse – the opposite operation. Addition is the inverse of subtraction, multiplication is the inverse of division
Long Multiplication – column multiplication where only the significant figures are noted
Number bonds to ten – 2 numbers that add together to make ten, like 2 and 8, or 6 and 4
Number bonds to 100 – 2 numbers that add together to make 100 like 20 and 80, or 45 and 55 or 12 and 88
Numberline – a line either with numbers or without (a blank numberline) Children use this tool to help them count on and back for addition, subtraction and also in multiplication and divison
Numberline Chunking - method of division involving taking chunks or groups or the divisor away from the larger number
Number sentence – writing out a calculation with just the numbers in a line e.g. 2+4=6 or 35 ÷7 = 5 or 12 x 3 =36 or 32 – 5 = 27
Partition – split up a larger number into hundreds, tens and units. e.g. 342 is 300 and 40 and 2
Place Value – knowing that in the number 342 – the '3' means '3 hundreds', the '4' means '4 tens' and the '2' means '2 units or ones'
Quarter - a number, shape or quantity divided into 4 equal parts
Recombine – for addition, once you have partitioned numbers into hundreds, tens and units then you have to add the hundreds together, then add the tens to that total, then add the units to that total
Remainder – a whole number left over after a division calculation
Repeated addition – repeatedly adding groups of the same size for multiplication
Significant digit – the digit in a number with the largest value, e.g. in 34 – the most significant digit is the 3, as it has a value of '30' and the '4' only has a value of '4'
Single digit – a number with only one digit. These are always less than 10
Taking away – a method for subtraction involving counting backwards from the larger to the smaller number
Tens number - a number in the ten times table – 10,20,30,40 50, etc.
Unit – another term for single digit numbers or 'ones': the right hand column in column methods is the 'units' column.

Resources that your children will use to help with calculation

Dienes

Dienes, although it has been used in schools for years, is a crucial step in knowing what a 'one' (unit), a ten, a hundred and a thousand look like and how they can be added together and split up to form smaller and larger numbers.

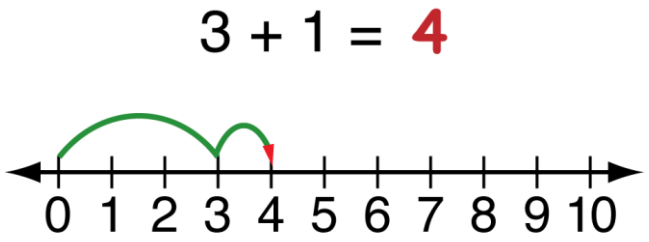
Cuisenaire Rods and a number track

Although these little rods that represent integers from 1 to 10 can be used for a range of aspects of maths, we normally use them for multiplication and division. They are also really useful for addition.

Numicon

Numicon is an especially useful resource as it can be used for teaching all four operations as well as fractions, decimals, percentages and a range of other aspects of maths. Each piece represents an integer from 1 to 10. The children love using it as it is colourful and tactile.

Numberlines



Numberlines are a mainstay of teaching calculations. We have pre numbered and blank numberlines in school that children can write on, or they can draw their own as appropriate for the calculation.

Addition

Ideas and strategies that children should master before tackling written calculations.

Vocabulary

+ Add
Addition
Plus
And
Count on
More
Sum
Total
Altogether
Increase

These steps lettered a-n, are not necessarily taught in order, they will be taught as the child becomes ready.

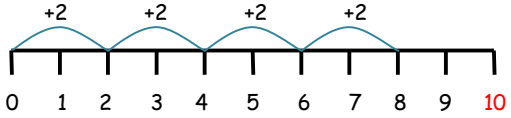
a) Addition can be done in any order. e.g. 6 + 2 = 8 or 2 + 6 = 8

b) Usually start with the largest number (so that you have to do less counting and so there is less potential for mistakes) e.g. 27 + 5 = 32

c) Must know **number bonds to 10** e.g. 1+9=10, 2+8= 10, 3+7=10, 4+6=10, 5+5=10 etc

d) **Addition facts** for all **single-digit** numbers. e.g. 1+1=2, 1+2=3, 1+4=5, 2+1=3, 2+2=4, 2+3=5 etc

e) Count forward in steps of 1,2, 5, 10 and 100 along a **numberline**



f) Understand the **numberline** as a continuum. A **numberline** is just a tool that helps us count forwards and backwards – it has no 'official' starting or ending point

g) **Concrete apparatus** available, e.g. using objects like multilink, Dienes, toys, blocks, Cuisinaire rods, Numicon

h) Understand **place value**, e.g. Knows that in the number 327, the '3' means '3 hundreds', the '2' means '20' and the '7' means 7

i) Can **partition** numbers, e.g. Can split a number like 327 into 300 + 20 + 7

j) Counting forwards in steps of different sizes. e.g. counting forwards in 1s – 1,2,3,4,5 etc; or in steps of 2 – 2,4,6,8,10 etc; or in steps of 5 – 5,10,15,20,25 etc; or in steps of 10 – 10,20,30,40,50 etc

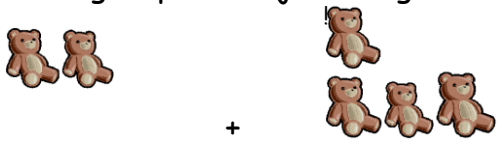
k) Know doubles of numbers from 1-10 e.g. double 3 is 6, (or 2 lots of 3 is 6, or 2 times 3 is 3, or 2 groups of 3 is 6)

l) Know doubles of numbers from 10-20. e.g. double 12 is 24, (or 2 lots of 12 is 24, or 2 times 12 is 24, or 2 groups of 12 is 24)

m) Know that adding numbers always produces a larger answer.

Calculation Strategies

1. Count up to 10 objects reliably.
2. Find 'one more' than a number. e.g. when given a number, say 13, they can count on to find 'one more' e.g. 14.
3. Add two or more groups of objects together to find a total less than 10. These may be **concrete apparatus** or pictures.

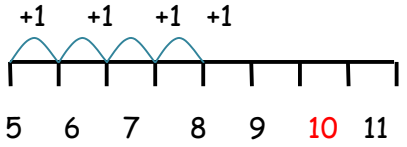


4. Use the + and = signs to record mental calculations in a **number sentence**. e.g. 2+6=8

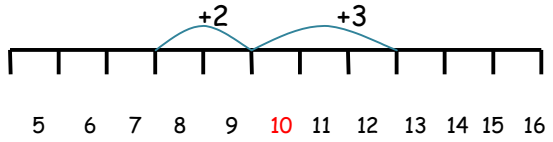
Addition

Non-standard methods

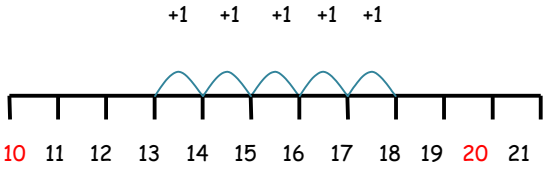
5. Count along a **numberline** to add **single digit** numbers together to find a total of less than 10, e.g. 5 + 4 = 9



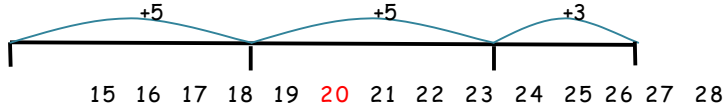
6. Add **single digit** numbers that **bridge to 10** using a **numberline**. This involves partitioning the smaller number in to 2 parts, one of which will add to the larger number to make 10, e.g. 8 + 5 = 13



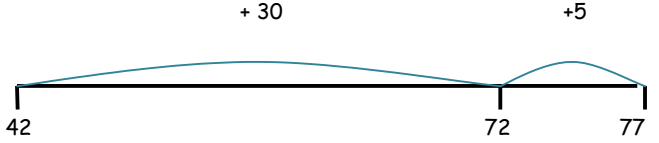
7. Add a **2-digit** number and a **single digit** number using a **numberline**,
e.g. 13 + 5 = 18



8. Add two **2-digit** numbers **bridging to 10** using a **numberline**. This involves partitioning the smaller number into 2 or more parts, one of which will add to the larger number to make a link to the 'next **tens number**'
e.g. 13+15 = 28 So split 13 into 5 and 5 and 3

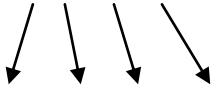


9. Add two **2-digit** numbers adding the most **significant digit** first using a **blank numberline**, e.g. 42 + 35= 77



10. **Partition** and **recombine**, e.g. 15 +13= 28 (MAY BE DONE OUT OF ORDER)

15 + 13



10 5 10 3

Then 10 + 10 + 5 + 3 = 28

11. Add a **3-digit** number and a **2-digit** number using a **numberline**, e.g.243 +64

Standard Written methods – Column Addition

12. 2-digit add 1-digit (expanded)

```
  70 + 4
+      8
-------
  82 + 2
-------
1 0
```

14. 2-digit add 2-digit

```
  40 + 6
+ 30 + 7
--------
  80 + 3
--------
1 0
```

15. 3-digit add 3-digit (including calculating with decimals)

```
  58.1
+ 35.2
------
  93.3
------
 1
```

16. 4-digit add 4-digit

```
  26.41
+ 36.82
-------
  63.23
-------
 1 1
```

Subtraction

Ideas and strategies that children should master before tackling written calculations.

These steps lettered a- f. are not necessarily taught in order, they will be taught as the child becomes ready.

Vocabulary

- Subtract
Take Away
Minus
Less
Fewer
Difference

Subtraction can be seen in two ways: as '**taking away**' or as '**finding the difference**'.

a) '**Taking away**' is usually used when subtracting a small number from a much larger one – **2-digit** subtract a **single digit** like 32 – 6. This is sometimes called 'counting back'. We will use this method in mental calculations only as the '**finding the difference**' method has more explicit links to more complex subtraction used further on in school.

b) Must know **number bonds** to 10 and the reverse, e.g. 1+9=10, 2+8+10, 3+7=10 etc and 10-1=9, 10-2=8, 10-3=7 etc

c) Must know **number bonds** to 100 (sometimes called **complements** to 100), e.g. 20+80 = 100, 45+55=100, 100-43=57, etc

d) Understand the **numberline** as a continuum - a **numberline** is just a tool that helps us count forwards and backwards – it has no 'official' starting or ending point

e) Subtraction cannot be calculated in any order, e.g. 9-4=5 is not the same as 4-9 = -5

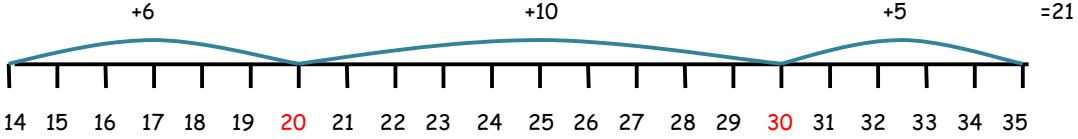
f) Understand **place value,** e.g. Knows that in the number 327, the '3' means '3 hundreds', the '2' means '20' and the '7' means

Calculation Strategies

1. Use **concrete apparatus** to physically '**take away**' from numbers less than 10

2. Use **concrete apparatus** or pictures to either '**take away**' or '**find the difference**' between 2 groups, e.g. 8-3=5

3. '**Finding the difference**' by counting on - by using a **numberline**, fingers or other **apparatus** or mentally count from a smaller number to a larger one, e.g. 35 – 14. Start at 14 and count on to 45. The 'difference' is the answer



4. Count on/count back in 1s or 10s on a **numberline**

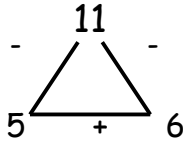
5. Counting forwards / backwards in steps of different sizes, e.g. counting in 1s, 2s,5,s,10s etc. from any given starting point

6. Find 'one less' than a number, e.g. when given a number, say 13, they can **count back** to find 'one less', e.g. 12

7. Use – and = signs to record mental calculations in **number sentences**, e.g. 23- 6 = 17

8. Addition/Subtraction inverses (**trios**)

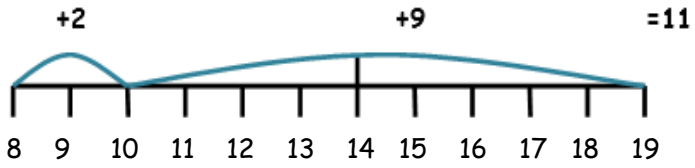
11-6 = 5
11-5 =6
5+6=11



Subtraction

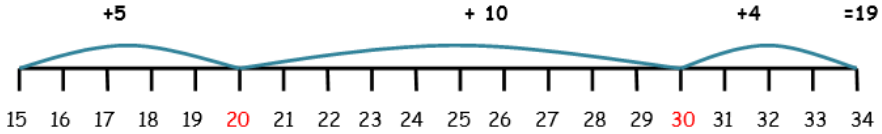
Non-standard methods

9. Use '**counting on**' to find the **difference** with a **numberline** from a **single digit** to a **2-digit** number less than 20, e.g. 19-8=11

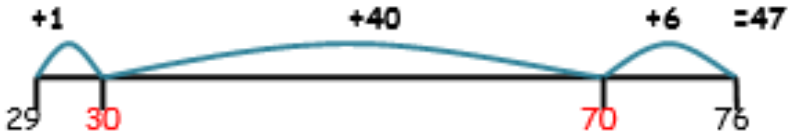


10. Subtract 10 from a **2-digit** number using 'counting on', on a **numberline**, e.g. 16- 10=6

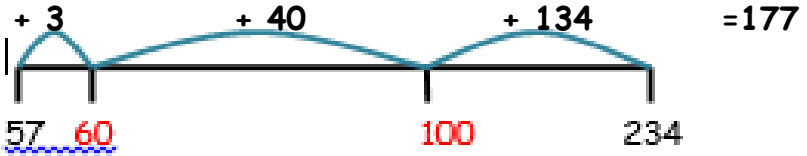
11. Use a **numberline** for **2-digit** numbers and subtract **2-digit** numbers using '**bridging to ten**', e.g. 34-15 = 19



12. Use a **numberline** for **2-digit** numbers subtract **2-digit** numbers taking bigger jumps to be more efficient, e.g. 76 – 29 = 47

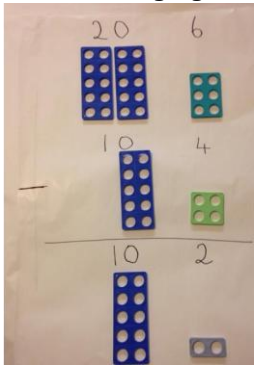


13. Use a number line for **3-digit** numbers subtract **2-digit** numbers using bigger jumps for efficiency, eg 234 – 57 = 177

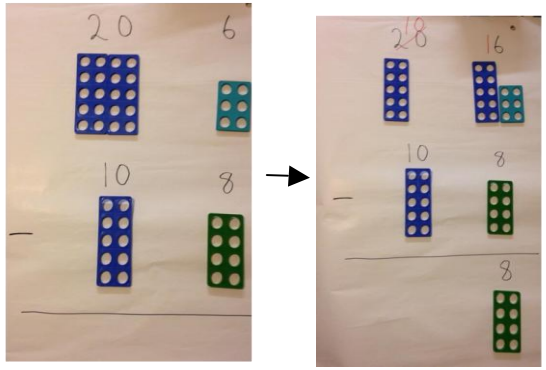


Standard written methods – Column Subtraction

14. Use Numicon or Dienes set out in **columns** for **2-digit numbers** subtract **two digit numbers** without 'exchanging'



15. Use Numicon or Dienes set out in **columns** for **2-digit numbers** subtract **2-digit numbers** with '**exchanging**'



16. **Use expanded column subtraction** for **3-digit numbers** subtract **3-digit numbers** with '**exchanging**', including exchanging both tens and units as necessary

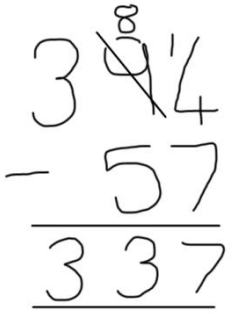
351- 234 =

300 + ~~50~~ 40 + 11

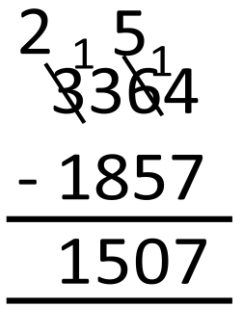
- 200 + 30 + 4

100 + 10 + 7 = 117

17. Use **compact column subtraction** for **3- digit numbers** subtract **2-digit numbers**



18. Use **column subtraction** for up to **4-digit** numbers including **decimal numbers**



Multiplication

Ideas and strategies that children should master before tackling written calculations.

These steps lettered a-h, are not necessarily taught in order, they will be taught as the child becomes ready.

Vocabulary

X Lots of
Groups of
Times
Multiply
Multiplication
Jumps
Multiple
Numberline
Product
Twice
Three times
Array
Row
Column
Double
Repeated addition

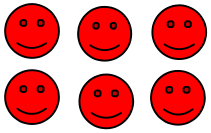
a) Understand **place value** e.g. Knows that in the number 327, the '3' means '3 hundreds', the '2' means '20' and the '7' means 7

b) Recognise simple sequences of numbers. e.g. 5,10,15,20 (add five each time or count in 5s) 2,4,6,8 (add 2 each time or count in 2s)

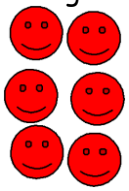
c) Be able to use a method for addition (see previous sections)

d) Know that multiplication can be calculated in any order e.g. 3x4=12 and 4x3=12

e) Be able to show multiplication facts using **arrays**. You can show a number, e.g. 6, in several ways using pictures or objects



2 rows of 3 are 6



3 rows of 2 are 6

1 row of 6 is 6

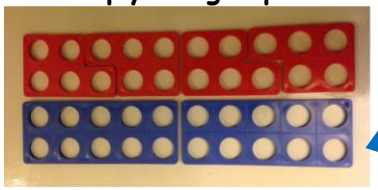
f) That multiplication and division are **inverse** of each other e.g. 2 x 6 = 12 and 12 ÷ 6 = 2

g) Can **double** numbers from 1 to 100 e.g. Double 4 is 8, 4x2=8

h) Multiplication is **repeated addition** e.g. To find 4 x 3, you add 4 groups of 3, or you add 3 four times :3+3+3+3 =12

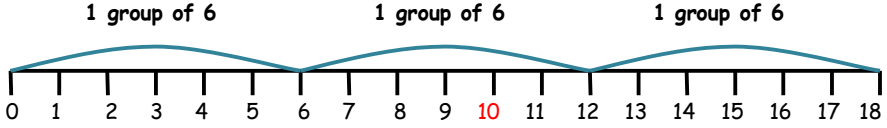
Calculation Strategies

1. Put objects into groups of the same number
2. Use Cuisenaire rods, or Numicon **to multiply using repeated addition e.g. 4 x 5= 20**

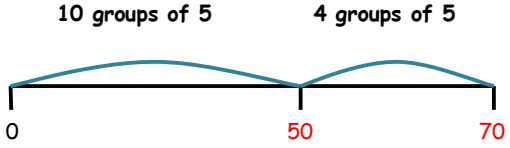


4 groups of 5 are equal to 20

3. Use a Cuisenaire rods or Numicon alongside a **numberline** for **repeated addition**
4. Use a numbered **numberline** and record the **jumps** (how many groups of..) for **single digit numbers** times **single digit numbers** e.g. 3 x 6



5. Use a **numberline** for **2-digit numbers** times **single digit numbers** e.g. 14 x 3
6. Use **times tables facts** to make more efficient jumps on a **numberline** e.g. for 14 x 5, you could add 10 x 5 and 4x5



Multiplication

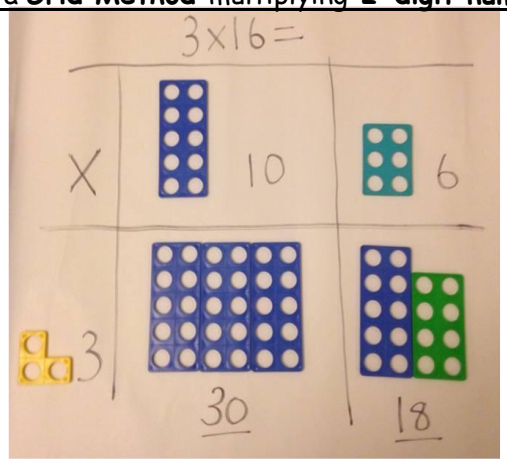
Non-standard methods

7. Use Dienes or Numicon set out in a **Grid Method** multiplying **2-digit numbers** by a **single digit number** e.g. 3 x 16 = 48

1) Partition 16 into 10 and 6

2) Put the 3 in the left column

3) Work out 3x10 and put the answer and the Numicon in the box



4) Work out 3x 6 and put the answer and the Numicon in the box

5) Add up the 'mini answers' 30 +18

```
  3 0
+ 1 8
-----
  4 8
```

8. Use **Grid Method** for **2-digit numbers** times **single digit numbers** e.g. 24 x 3 = 72

1st – Partition 24 into 20 and 4
2nd – Work out 20 x 3 and put the answer in the box
3rd - Work out 4 x 3 and put the answer in the box
4th – Add your answers together either mentally or using column addition

X	20	4
3	60	12

```
  6 0
+ 1 2
-----
  7 2
```

9. Use **Grid Method** for **2-digit numbers** times **2-digit numbers**

(Dienes or Numicon could be used to support if needed)

e.g. 24 x 32 = 768

1st – Partition 24 into 20 and 4
2nd –Partition 32 into 30 and 2
3rd – Work out 20 x 30 and put the answer in the box
4th – Work out 4 x 30 and put your answer in the box
5th – Work out 20 x 2 and put your answer in the box
6th – Work out 4x2 and put your answer in the box
7th – Add your answers together using column addition

x	20	4
30	600	120
2	40	8

```
  6 0 0
+ 1 2 0
-------
    4 0
      8
-------
  7 6 8
```

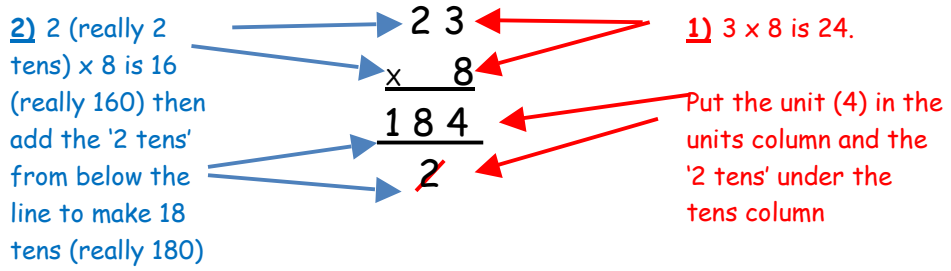
10. Use **Grid Method** for **3-digit numbers** times **2-digit numbers**

11. Use **Grid Method** for **3-digit numbers** times **3-digit numbers**

Multiplication

Standard Written Methods

13. Short Multiplication for **2-digit numbers** times **single digit numbers** e.g. 23 x 8



14. Expanded Multiplication for **2-digit numbers** times **2-digit numbers** e.g. 23 x 18

```
  2 3
X 1 8
  2 4 (8x3)
1 6 0 (8x20)
  3 0 (10x3)
2 0 0 (10x20)
4 1 4
1
```

15. Expanded Multiplication for **3-digit numbers** times **2-digit numbers** e.g. 234x 64

16. Expanded Multiplication for **3-digit number** times **3-digit numbers** e.g. 234 x 456

17.Long Multiplication for **2-digit** number times **2-digit** numbers e.g. 23 x 18

4) 1x3 (really 10x3) is 3 (really 30) – Write the 3 in the tens column.

5) 1x2 (really 10x20) is 2 (really 200) Write the 2 in the hundreds column

6) Add up both of your 'mini answers'

```
  2 3
x 1 8
1 8 4
2 3 0
4 1 4
1
```

1) 8x3 is 24. Write the 4 in the units column and the 2 (really 20) in the tens column.

2) 8x2(really 8x20) is 16 (really 160) add the 2 tens from below the line to make 18 (really 180)

3) Place a '0' in the units column as everything will now be multiplied by a 'tens number'.

18. Long multiplication for **3-digit numbers** times **2-digit numbers** e.g. 234 x64

19. Long multiplication for **decimal numbers** e.g. 23.4 x 64.7

Division

Ideas and strategies that children should master before tackling written calculations.

These steps lettered a-j, are not necessarily taught in order, they will be taught as the child becomes ready.

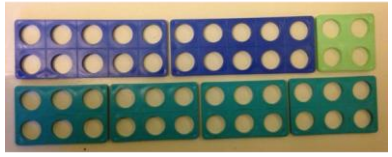
a) Understand **place value** e.g. Knows that in the number 327, the '3' means '3 hundreds', the '2' means '20' and the '7' means 7
b) Put objects into groups of the same number
c) Recognise simple sequences of numbers e.g. 5,10,15,20 (add five each time or count in 5s) 2,4,6,8 (add 2 each time or count in 2s)
d) Be able to use a method for subtraction (see previous sections)
e) Recall multiplication facts up to 12 x 12 and derive division facts e.g. 5 x 4 = 20, so 20 ÷ 5 = 4 and 20 ÷ 4 = 5
f) That multiplication and division are inverse of each other e.g. 2 x 6= 12 and 12÷ 6 =
g) Can find a **half** ($\frac{1}{2}$) and a **quarter** ($\frac{1}{4}$) of a group of objects or a whole number
h) Can **double** and **halve** numbers from 1 to 100 e.g. Double 4 is 8, 4x2=8; half of 8 is 4, 8÷2=4
i) Know that division is not commutative, cannot be calculated in any order, e.g. 12÷4=3 is not the same as 12÷3=4

Vocabulary

÷
Lots of
Groups of
Share
Group
Jumps
Numberline
Equal
Halve
Divide
Division
Divided by
Remainder
Factor
Decimal
Decimal place
Divisible

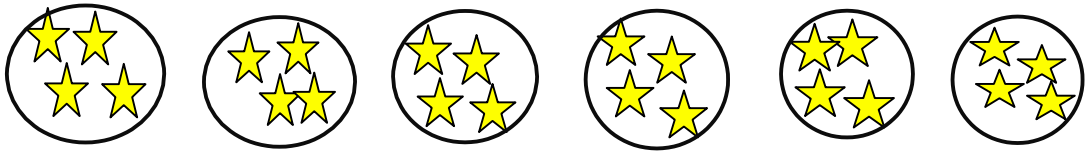
Calculation Strategies

1. Share objects into groups of equal size
2. Use Numicon to divide numbers into chunks of equal size e.g. 24÷6 = 4

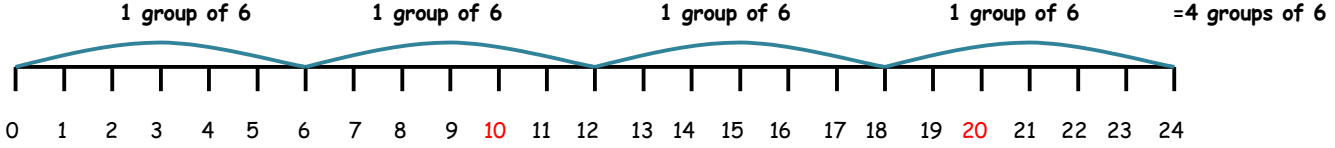


24 divided into groups (chunks) of 6
There are 4 groups of 6 in 24

3. Use dots/pictures and circles on paper e.g. 24÷6 =4



4. **Repeated addition of groups of numbers** using a numbered **numberline** e.g. 24 ÷6 = 4



Division

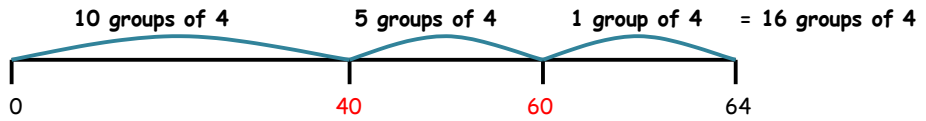
Non-standard methods

'Chunking' is a non-standard method of division that is based on repeated subtraction

Numberline Chunking

5. Use **Numberline Chunking** for **2-digit numbers** divided by **single digit numbers** e.g. 64 ÷4 =16

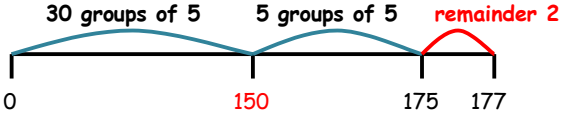
1) Use a fact box to write down the times tables facts for the **divisor** (4).
2) Draw a **numberline** starting at 0 and ending with the 'target number' (64).
3) Choose the 'mini answer' from the table that is closest to the 'target number' without going over.



4) Record that 'mini answer' on the **numberline** and write how many '**groups** it was above the jump.
5) Which 'mini answer' can you add now to get closest to the 'target number' without going over?
6) Repeat until you end at the 'target number'. Count up how many 'groups' you have added. This is the answer.

Fact Box		
2 x4	**5x4**	**10 x4**
8	20	40
20 x 4	**50 x 4**	**100 x4**
80	200	400

6. Use **Numberline Chunking** for **3-digit** numbers divided by **single digit** numbers with **remainders** (using more efficient jumps) e.g. 177÷5



7. Use **Numberline Chunking** for **3-digit** numbers divided by **2-digit** numbers with **remainders**

Fact Box		
2 x5	**5x5**	**10 x5**
10	25	50
20 x 5	**50 x 5**	**100 x5**
100	250	500

Column Chunking (it is vital that children align the columns accurately, tens above tens etc)

5) Use **Column Chunking** for **2-digit numbers** divided by **single digit numbers** e.g. 64÷4 = 16

1) Use a table to write down the times tables facts for the divisor (4).
2) Write the largest number and then choose which is the biggest group of 4 you can subtract (10groups of 4 = 40). Subtract this from the 64.
3) Write the answer and then choose the largest multiple of 4 you can subtract next (5 groups of 4 =20).
6)Repeat until you are left with 0, then count up how many 'groups' you subtracted (16 groups of 4).

```
      16
4 | 64
  - 40 (10 x 4)
    24
  - 20 (5 x 4)
     4
  -  4 (1 x 4)
     0
```

Fact Box		
2 x4	**5x4**	**10 x4**
8	20	40
20 x 4	**50 x 4**	**100 x4**
80	200	400

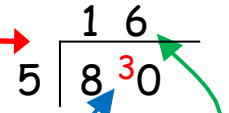
6. Use **Column Chunking** for **3-digit numbers** divided by **single digit numbers** with **remainders** (using more efficient chunks)
7. Use **Column Chunking** for **3-digit numbers** divided by **2-digit numbers** with **remainders**.

Division

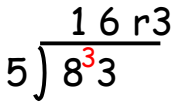
Standard Written Methods (This strategy should only be taught after children understand the chunking process so the concept of the values of numbers is maintained)
(It is vital that children align the columns accurately, tens above tens etc)

8. Use **short division** to divide a **2-digit number** by a **single digit number** e.g. 80÷5 =

1) How many groups of 5 are in 8 (really 80)? 1. Write the '1' (really 10) above the '8' (80),on the line.
2) How many are left over? 1 group of 5 is 5, and there are 3 (really 30) more to reach 8 (80). Write this '3' next to the '0'
3) How many groups of 5 are in 30? 6. Write the '6' above the '0' on the line.
4) Therefore, 80÷5=16



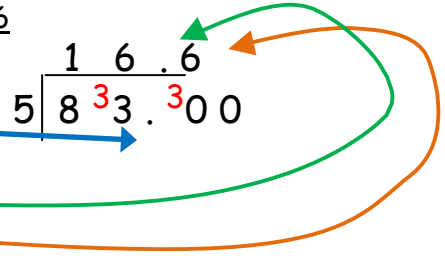
9. Use **short division** to divide a **2-digit number** by a **single digit number** with **remainders** e.g. 83 ÷5 = 16r3



10 Use **short division** to divide a **3-digit number** by a **single digit number** with **remainders** e.g. 483 ÷5

11. Use **short division** to divide a **3-digit number** by a **single digit number** with **a decimal answer** e.g. 83 ÷5 = 16.6

1) Complete the steps until you reach the point where there would be a remainder THEN
2) Put a decimal point and two '0' after the number being divided
3) Put a decimal point after the last number on the line.
4) How many groups of 5 are in 30? 6. Write the '6' above the line.
Link this knowledge to 3 being divided by 5 which is three fifths or 0.6.



12. Use **short division** to divide a **decimal number** by a **single digit number** with **a decimal answer** e.g. 83.7 ÷5 = 16.74

13. Use **short division** to divide a **number up to 4 - digits** by a **2 - digit** divisor e.g. 837 ÷ 26 = 32.19

Division

14. Use **Long Division** to divide up to **4-digit numbers** by a **2-digit number** with a **decimal answer** e.g. 462÷13 =35.53

1) Set out the numbers for the calculation (divisor on the left) and put in a decimal point and two '0's

```
13 ⟌ 4 6 2. 0 0
```

2) How many groups of 13 are in 4? None. Write a '0' above the 4.
3) How many groups of 13 are in 46? 3. Write a '3' above the '6'

```
     0 3
13 ⟌ 4 6 2. 0 0
```

4) What is 3 x 13? 39. Write this '39' underneath the '46' and subtract it. Write the answer '7' underneath the '9'

```
     0 3
13 ⟌ 4 6 2. 0 0
(3 x13=39) - 3 9
       7
```

5) Bring down the '2' and write it next to the '7'

```
     0 3
13 ⟌ 4 6 2. 0 0
(3 x13=39) - 3 9 ↓
       7 2
```

6) How many groups of 13 are there in 72? 5. Write the '5' above '2' on the answer line

```
     0 3 5
13 ⟌ 4 6 2. 0 0
(3 x13=39) - 3 9 ↓
       7 2
```

7) What is 5 x 13? 65. Write '65' below the '72' and subtract it. Write the answer '7' underneath the '5'.

```
     0 3 5
13 ⟌ 4 6 2. 0 0
(3 x13=39) - 3 9 ↓
       7 2
(5x13 = 65)  - 6 5
         7
```

8) Put the decimal point into the answer line.
9) Bring down the '0' and write it next to the '7'

```
     0 3 5.
13 ⟌ 4 6 2. 0 0
(3 x13=39) - 3 9 ↓
       7 2
(5x13 = 65)  - 6 5 ↓
         7 0
```

10) How many groups of 13 are in 70? 5. Write the '5' on the answer line above the '0'

```
     0 3 5. 5
13 ⟌ 4 6 2. 0 0
(3 x13=39) - 3 9 ↓
       7 2
(5x13 = 65)  - 6 5 ↓
         7 0
```

11) What is 5 x13? 65. Write the 65 below the 70 and subtract it. Write the answer 5 underneath the '5'.

```
          035.5
      13 ⟌462.00
(3x13=39) - 39↓
            72
          - 65↓
             70
           - 65
              5
```

12) Bring down the next '0' and write it next to the '5'

```
          035.5
      13 ⟌462.00
(3x13=39) - 39↓
            72
          - 65↓
             70
           - 65↓
              50
```

13) How many groups of 13 are in 50? 3. Write the '3' above the '0' on the answer line.

```
          035.53
      13 ⟌462.00
(3 x13=39) - 39↓
             72
(5x13 = 65)- 65↓
             70
(5x13=65)  - 65
              50
```

14) What is 3 x 13? 39. Write '39' below the '50' and subtract it. Write the answer '11' underneath the '5'.

```
          035.53
      13 ⟌462.00
(3 x13=39) - 39↓
             72
(5x13 = 65)- 65↓
             70
(5x13=65)  - 65↓
              50
(3x13=39)   - 39
              11
```

15) Now there are two decimal places in the answer, you can stop working!

14. Use **Long Division** to divide a **up to 4-digit numbers**, including decimals by a **2-digit number** with a **decimal answer** e.g. 462.7÷13 =35.59