Landscore Primary School

# Helping your child with maths

# Maths Booklet – Calculations

The information in this booklet is to help you support your child with maths.It explains some of the different strategies used for mental and written calculations in school.

The aim is that your child becomes more confident in their maths and that they enjoy what they do because they have a genuine understanding.

When faced with a calculation or problem, encourage your child to think about . . . .

What information they are being told and what they need to work out.

What information they will need to help solve this problem.

Other facts they know that will help them with this problem or calculation.

How this maths links to other areas of maths.

Can they do this in their head or will they need to make jottings or use a written method?

Also help your child to estimate and then check the answer. Encourage them to ask . . . .

Is the answer sensible?

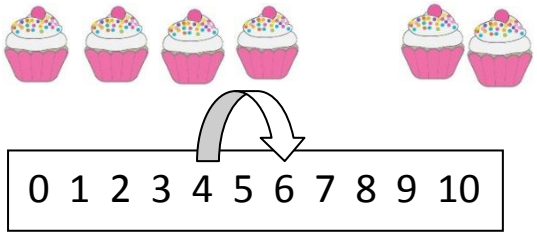
# ADDITION

**Children are taught to understand addition as combining two sets and as counting on.**

Children are first taught to count on in ones from any number. They then progress to counting on in tens from any number, for example: 12, 22, 32, 42.

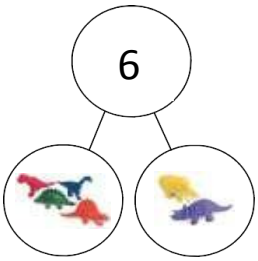
**4+2 =**


I have 4 cakes and my friend has 2. How many cakes do we have altogether?

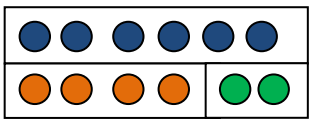



Initially children will use concrete apparatus such as counters or Numicon to help solve problems. Later they may draw a picture to help them work out the answer, use tally marks or count on a number line.

Part-part-whole




Bar model



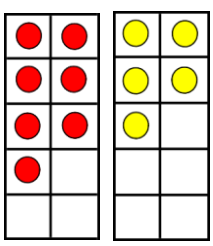
4 + 2 = 6
2 + 4 = 6
6 – 2 = 4
6 – 4 =2

We use ‘part-part-whole’ diagrams and ‘bar models’ to record these images.

The children need to develop rapid recall of their number bonds up to 10 and 20 in year 1/2.

Bridging ten using a tens frame

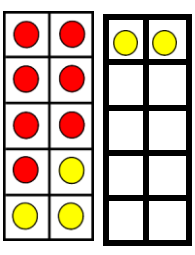
7 + 5 =



7 + 5 = ?

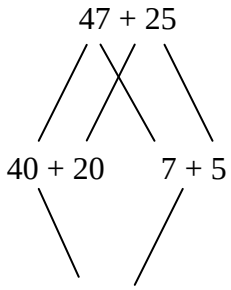
7 + 3 + 2 = ?

10 + 2 = 12

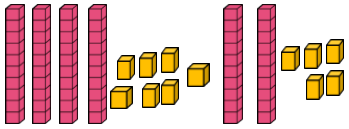


**Partitioning**

**47+25 =**




Using Dienes



60 + 12 = 72

40+20 = 60

7 + 2 = 12

60 + 12 = **72**

Or with larger numbers:

**125+246 =**

100+200 = 300

20+40 = 60

5+6 = 11

300+60+11 = **371**

The method opposite is known as "partitioning". Basically we partition the number into it's place value parts; the hundreds, tens and ones.

The parts are solved individually and then combined to get the answer. We use Dienes to support this method.

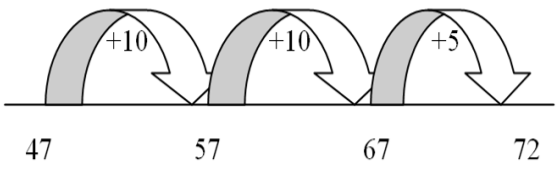
The strength of partitioning can be carried through to larger numbers.

**47+25 =**

My sunflower is 47cm tall.
It grows another 25cm. How tall is it now?

100 square

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 |
| 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 |
| 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |




As problems get more challenging, we use 100 squares or draw an empty number line which helps children to record the steps they have taken in a calculation (start on 47, +20, then +5).

This is much more efficient than counting on in ones.

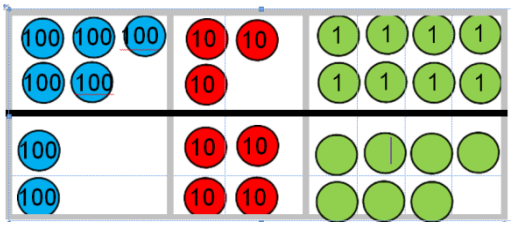
**538+247 =**

There are 538 boys and 247 girls in a school, how many children are there altogether?

**Partitioned Expanded method:**

500 + 30 + 8
+ 200 + 40 + 7
700 +70+15 = 785

This method can be modelled using place value counters:




**Then Expanded method:**

5 3 8
+ 2 4 7
1 5 (8+7)
7 0 (30+ 40)
7 0 0 (500+200)
**7 8 5**

Children will be taught written methods for those calculations they cannot do in their heads.

Expanded methods build on mental methods and make the value of the digits clear to children.

4 8 7
+ 5 4 6
1 1 (- gully)
1 0 3 3

When children are confident using the expanded method, they start to use a more compact method.

The 'gully' is used to carry the digits when there is more than 9 in any column.

They then start to use larger numbers and move onto working with decimals.

## SUBTRACTION

**Children are taught to understand subtraction as both taking away (counting back) and finding the difference (counting up)**

**5-2 =**

I had five balloons. Two burst. How many did I have left?

Take away

A teddy bear costs £5 and a doll costs £2. How much more does the bear cost?

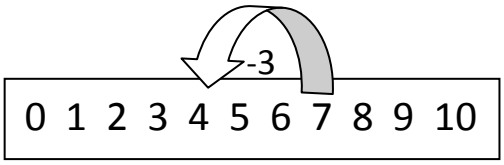
Find the difference

Initially children will use concrete apparatus such as counters or Numicon to help solve problems. Later they may draw a picture to help them work out the answer or count on a number line.

Drawing a picture helps children to visualise the problem.

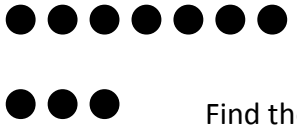
**7 - 3 =**

Mum baked 7 biscuits. I ate 3. How many were left?

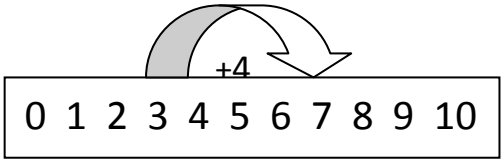



Take away

Lisa has 7 felt tip pens and Tim has 3. How many more does Lisa have?



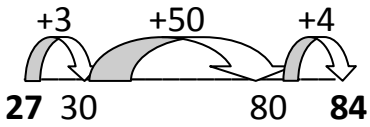
Find the difference




Counting back in ones on a number line for taking away.

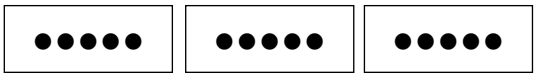
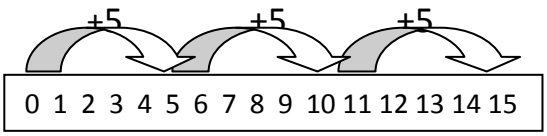
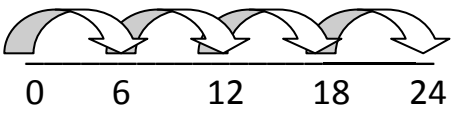
Finding the difference can also be seen as 'counting up to'.
Start on one number and count up to the other number to find the difference.

Start on 3 and count up to 7.

| | |
|---|---|
| **84-27 =**<br>I cut 27cm off a ribbon measuring 84cm. How much is left?<br>  <br><br>Answer: 84-27 = **57** | Children count up from the smallest number to the biggest number using an empty number line.<br>This is a really good way for them to record the steps they have taken.<br>They count from the smallest number to the next multiple of 10 and then to the full number. |
| **84 – 27 =**<br>84 – 20 - 7 =<br>64 – 7 = 57 | Children can keep the first number whole and then partition the second number to take it away more easily. |
| **Partitioned Expanded method:**<br>74 - 32<br>70 + 4<br>- 30 + 2<br>40 + 2 = **42**<br><br>**Decomposition**<br>81 - 57<br>80 +1 ⇨ 70+11<br>50 +7 ⇨ 50+7<br>**20+ 4 = 24**<br>**Compact method**<br>7<br>8 $^{1}$1<br>- 5 7<br>2 4 | This method moves towards a more formal written method but uses partitioning to help children's understanding.<br><br>This method is known as "decomposition". It prepares children for the standard method.<br><br>Children then can choose to use the standard compact method. |

# MULTIPLICATION

**Children are taught to understand multiplication as repeated addition and scaling. It can also be described as an array.**

| | |
|---|---|
| **2 x 4 =**<br>Each child has two eyes. How many eyes do four children have?<br>  <br>2 + 2 + 2 + 2 | Initially, a picture or concrete objects can be useful. |
| **5 x 3 =**<br>There are 5 cakes in a pack. How many cakes in 3 packs?<br>  <br>5 + 5 + 5<br>  <br> | Dots or tally marks are often drawn in groups.<br><br>This shows 3 groups of 5.<br><br>Jumping in groups along a number line. 3 jumps of 5. |
| **4 x 3 =**<br>A chew costs 4p. How much do 3 chews cost?<br>●●●● or ●●●<br>●●●● ●●●<br>●●●● ●●●<br>●●●<br>4 x 3 = 12<br>3 x 4 =12<br>12 ÷ 3 = 4<br>12 ÷ 4 = 3 | Drawing an array (3 rows of 4 or 3 columns of 4) gives children an image of the answer.<br>It also helps develop the understanding that 4 x 3 is the same as 3 x 4 and then develop the understanding of division as the inverse. |
| **6 x 4 =**<br>There are 4 cats. Each cat has 6 kittens. How many kittens are there altogether?<br>  <br> | Children count in equal steps, recording each jump on an empty line.<br><br>This shows 4 jumps of 6. |

## Grid method

**6 x 34 =**

34 books were sold. Each book cost £6. How much money was taken?

| x | 30 | 4 | |
|---|---|---|---|
| 6 | 180 | 24 | **= £204** |

The grid method starts to move towards the formal written method. 34 is partitioned into parts (30 and 4) and each of these is multiplied by 6. The answers are then added together.

**72 x 34 =**

A flag is 72cm long. If I need 34 flags, how much material do I need to order?

| x | 70 | 2 | |
|---|---|---|---|
| 30 | **2100** | **60** | **=2160** |
| 4 | **280** | **8** | **= 288** |
| | | | **2448** |

This method also works for "long multiplication" and decimals. Children can see each stage of the calculation. Children need to have a good understanding of multiplying by 10 and 100.

## Compact method

24 x 6 = 144

| | | 2 | 4 |
|---|---|---|---|
| x | | | 6 |
| | 1 | 4 | 4 |
| | | 2 | |

1) Start with the units. 4 x 6 =24 (carry 2 tens over to tens column)

2) 2 x 6 = 12. Add the 2 tens = 14.

The compact method requires children to have a secure understanding of place value and times table facts.

Children must make sure digits are in the correct columns.

## Long multiplication

124 X 26 = 3224

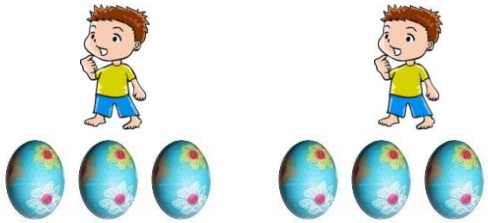
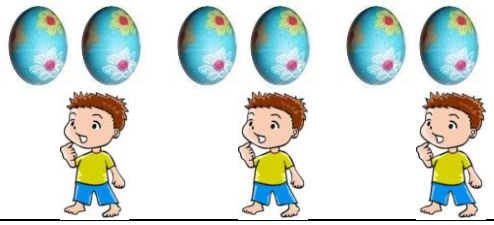
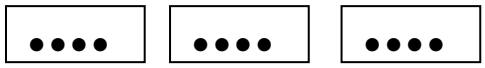
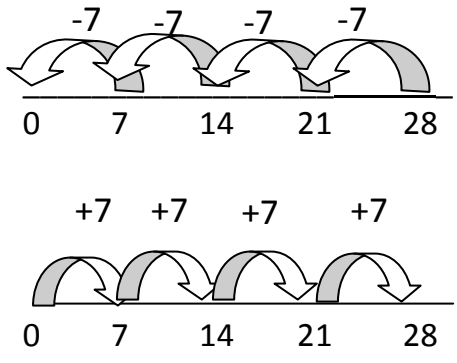
```
   1 2 4
 X   2 6
 -------
   7 4 4
+  1 2
 -------
 2 4 8 0
 -------
 3 2 2 4
 -------
   1 1
```

- Multiply the top ones digit by the lower ones digit: 6 x 4 = 24. The '4' goes in the ones column and the '2' tens are carried over to the tens.
- Multiply the top tens digit by the lower ones digit: 6 x 2= 12. Add the 2 tens carried over which makes 14. The '4' is placed in the tens column and the 1 is carried over to the hundreds column.
- Multiply the top hundreds by the lower ones digit: 6 x 1 = 6 Add the 1 (hundred) carried over= 7.
- Write a zero in the ones column below the '4' to show all x 10.

Follow the above process with the lower tens digit and all the top digits.

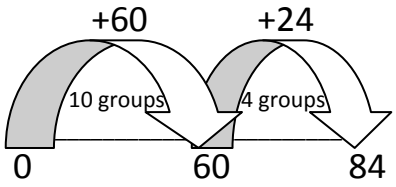
**DIVISION**

**Children are taught to understand division as both sharing and grouping.**

| | |
|---|---|
| **6 ÷ 2 =**<br>6 Easter eggs are shared between 2 children. How many eggs do they get each?<br>  <br>There are 6 Easter eggs. How many children can have two each?<br>  | More pictures!<br>Drawing often gives children a way into solving the problem.<br><br>Sharing between 2<br><br>Grouping in twos |
| **12 ÷ 4 =**<br>4 apples are packed in a basket. How many baskets can you fill with 12 apples?<br>  | Dots or tally marks can either be shared out one at a time or split up into groups.<br><br>Grouping in fours |
| **28p ÷ 7p =**<br>A chew bar costs 7p. How many can I buy with 28p?<br>  <br> | To work out how many 7s there are in 28, draw jumps of 7 along a number line (you can jump up **or** back). This shows you need 4 jumps of 7 to reach 28 or there are 7 lots of 4 in 28. |

**84 ÷ 6 =**

I need 6 drawing pins to put up a picture. How many pictures can I put up with 84 pins?




It would take a long time to jump in sixes for 84 so children can jump on in bigger "chunks". A jump of 10 groups of 6 takes you to 60. Then you need another 4 groups of 6 to reach 84. Altogether, that is 14 groups of 6.

**184 ÷ 7 =**

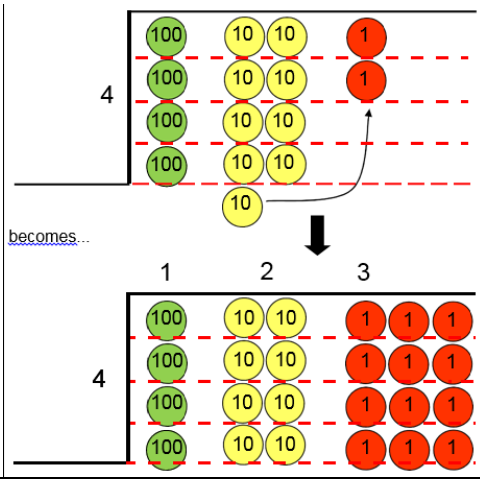
I need 184 chairs for a concert. I arrange them in rows of 7. How many rows do I need?

```
  1 8 4
- 1 4 0     20 groups
    4 4
-   4 2     6 groups
      2
        = 26 r2
```

This method is known as chunking. In this example, you are taking away chunks of 7. First subtract 140 (20 groups of 7) and you are left with 44. Then subtract 42 (6 groups of 7), to leave 2.
Altogether, that is 26 sevens with a remainder of 2.

**Compact method with place value counters**

**492 ÷ 4 =**




```
  123
4|492
```

When introducing the compact formal method for division, we use base ten apparatus such as place value counters to develop greater understanding.

In this example, 4 will only go into 80 (not 90) so we have 1 ten left over. We then need to exchange that ten for 10 ones.

**Compact method**

**367 ÷ 4 =**

```
  0 9 1 r3
4|3 6 7
```

The compact method is often referred to as the 'bus stop' method.

1) See how many times the divisor will divide into each digit. 3 ÷ 4 is not possible so we carry the 3 hundreds over.
2) 36 ÷ 4= 9 (answer goes directly above digits on top of bus shelter).
3) 7 ÷ 4 = 1 r 3 (answer to be placed on top of bus shelter next to other digits).

# How can you help at home?

- Practise recalling times tables and number facts
- Count using money
- Tell the time
- Weigh and measure out cooking ingredients
- Guess the shape
- Play puzzles and other games that develop numerical and logical reasoning.

**Websites**

There are several good websites for practising Maths at home and developing skills with number and reasoning. You may like to look at:

http://www.mathsisfun.com/ Covers all areas of Maths. Lots of good logic puzzles!

http://www.coolmath4kids.com/ Covers all areas of maths

http://www.bbc.co.uk/bitesize/ks2/maths/ Covers all areas of maths

http://www.maths-games.org/times-tables-games.html - Good website for grouping games for all areas of maths from various websites.

http://www.crickweb.co.uk/ Good variety of maths games.

http://www.topmarks.co.uk/Flash.aspx?f=SpeedChallenge speed challenge activities for practising times tables, rounding, number bonds.

**Give your child lots of praise and encouragement!**