Highbury Primary School

Written Calculation Strategies

(A guide for parents and carers)

Introduction

Many people who were brought up on pages of 'hard sums' may think that the maths their child brings home looks very different from the way they were taught. They may also think that maths is a 'boring' or 'difficult' subject and may lack confidence in it themselves. It doesn't have to be this way, maths can be fun and if taught to understand numbers properly, calculations become much easier to grasp and use!

The aim of this booklet is to help support and develop your child's mathematical understanding by following a clear progression of stages.

Your child's maths book may look very different from the way you remember yours to have looked. This is mainly due to the fact that there are not simple 'formal calculations' but a whole range of styles of recording including; pictures, diagrams, jottings and blank number lines. The reason for this is that written calculations are not the ultimate aim: the aim is for children to do calculations in their own heads and, if the numbers are too large, to use a way of writing them down that helps their thinking.

As children continue to develop their knowledge and understand, they will be encouraged to approach any calculation by first asking; 'Can I do this in my head?' (This could be with jottings). If they can't they are then encouraged to look for the most suitable written method or, during years 5 and 6, use a calculator for more complex calculations.
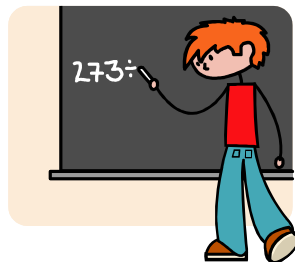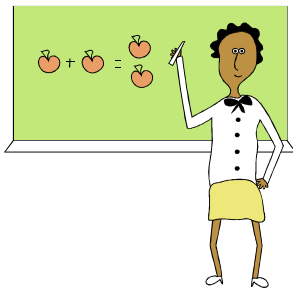
When faced with a calculation problem, encourage your child to ask….

- ❖ Can I do this in my head?

- ❖ Could I do this in my head using drawings or jottings to help me?

- ❖ Do I need to use a written method?

- ❖ Should I use a calculator?

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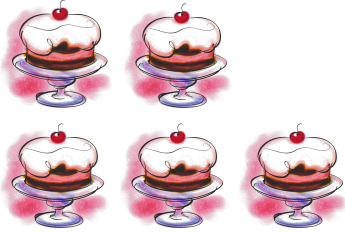
Encourage them to ask…

Is the answer sensible?

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

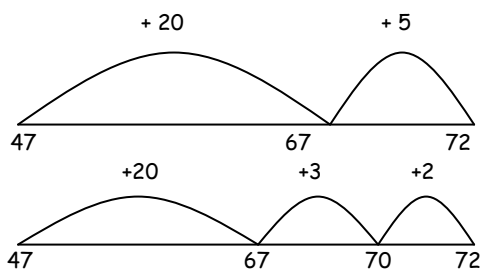|	
2 + 3 = At a party, I eat 2 cakes and my friend eats 3. How many cakes did we eat altogether?	Children could draw a picture to help them work out the answer.
7 + 4 = 7 people are on the bus. 4 more get on at the next stop. How many people are on the bus now? ‖‖‖‖‖ ‖‖‖	Children could use dots or tally marks to represent objects – quicker than drawing a picture.
47 + 25 = My sunflower is 47cm tall. It grows another 25cm. How tall is it now? + 20 + 5 47 67 72 +20 +3 +2 47 67 70 72	Drawing an empty number line 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.

ADDITION

487 + 546 =

There are 487 boys and 546 girls in school. How many children are there altogether?

```
    5 4 6
 +  4 8 7
    1 3
  1 2 0
  9 0 0
1 0 3 3
```

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 digits clear to children. The language used is very important.

6 + 7, 40 + 80, 500 + 400, then 900 + 120 + 13

Add this mentally NOT in columns.

12786 + 2568 =

12786 people visited the museum last year. The numbers increased by 2568 this year. How many people altogether visited this year?

```
  1 2 7 8 6
 +  2 5 6 8
  1 5 3 5 4
      1 1 1
```

When children are confident using the expanded method, this can be 'squashed' into the traditional compact method.

SUBTRACTION

Children are taught to understand subtraction as taking away (counting back) and finding the difference (counting on).
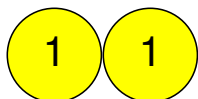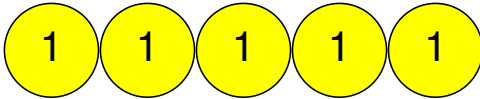
5 – 2 =

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

Take away

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

| 1 | 1 | 1 | 1 | 1 |

| 1 | 1 | Find the difference

Drawing pictures helps children to visualise the problem.

7 – 3 =

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

I I I I ⧾⧾ Take away

Lisa has 7 felt tip pens and Tim has 3. How many more does Lisa have?
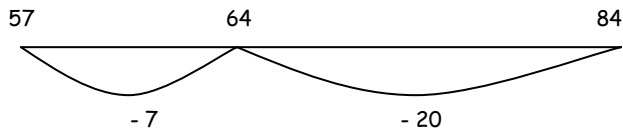
0 0 0 0 0 0 0

0 0 0 Find the difference

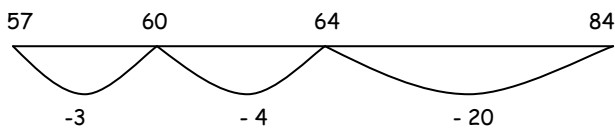Using dots or tally marks is quicker than drawing a detailed picture.

SUBTRACTION

84 – 27 =

I cut 27cm off a ribbon measuring 84cm. How much is left?

57	64	84

- 7   - 20

or

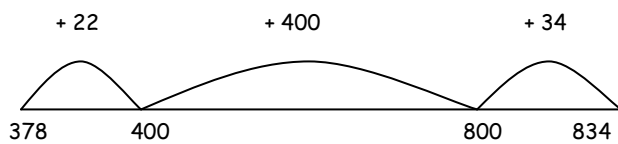| 57	60	64	84

-3   - 4   - 20

Children could count back using an empty number line. This is a really good way for them to record the steps they have taken.
(Start on 84, - 20, then – 7)

834 – 378 =

The library owns 834 books.
378 are out on loan.
How many are on the shelves?

+ 22   + 400   + 34

378   400   800   834

```
    2 2   (400)
  4 0 0   (800)
    3 4   (834)
  4 5 6
```

Children could count up (from the smallest number to the biggest) using an empty number line.
It is easiest to count up to a multiple of 10 or 100 (a friendly number). The steps can also be recorded vertically.
This method works really well with any number, including decimals!

MULTIPLICATION

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

2 x 4 =

Each child has two eyes. How many eyes do four children have?

2 + 2 + 2 + 2

Again a picture can be useful.

5 x 3 =

There are 5 cakes in a pack. How many cakes in 3 packs?
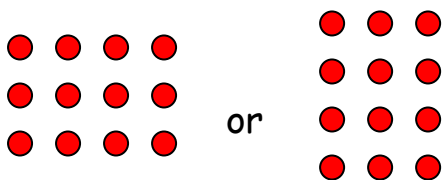
IIIII   IIIII   IIIII
5   +   5   +   5

Dots or tally marks are often drawn in groups.
This shows 3 groups of 5.

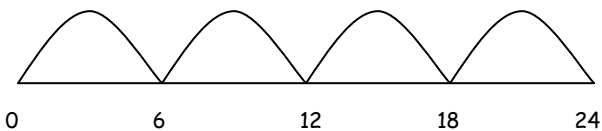4 x 3 =

A chew cost 4p.
How much do 3 chews cost?

or

Drawing an array (3 rows of 4 or 3 columns of 4) gives children an image of the answer. It also helps develop the understanding that 4 x 3 is the same as 3 x 4.
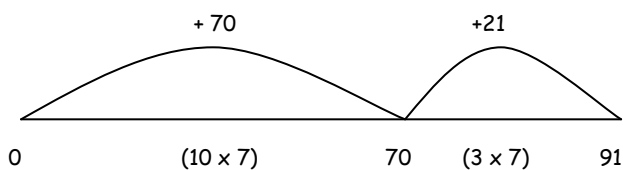
MULTIPLICATION

6 x 4 =

There are 4 cats. Each cat has 6 kittens. How many kittens are there altogether?

| 0 | 6 | 12 | 18 | 24 |

Children could count on in equal steps, recording each jump on an empty number line.
This shows 4 jumps of 6.

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13 x 7 =

There are 13 biscuits in a packet. How many biscuits in 7 packets?

| 0 | (10 x 7) | 70 | (3 x 7) | 91 |

When numbers get bigger, it is inefficient to do lots of small jumps.
Split 13 into parts (10 and 3).
This gives you two jumps
(10 x 7 and 3 x 7).

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6 x 124 =

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

	100	20	4	
6	600	120	24	= 744

This is called the grid method. 124 is split into parts (100, 20 and 4) and each of these is multiplied by 6.
The three answers are then added together.

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72 x 34 =

A cat is 72cm long. A tiger is 34 times longer.
How long is the tiger?

	70	2		
30	2100	60	=	2160
4	280	8	=	288
				2448

This method also works for 'long multiplication'. Again split up the numbers and multiply each part. Add across the rows and then add those two answers together.

DIVISION
Children are taught to understand division as sharing and grouping.

$6 \div 2 =$

6 Easter eggs are shared between 2 children.
How many eggs do they get?

Sharing between 2

There are 6 Easter eggs. How many children can have two each?

Grouping in twos

More pictures!
Drawing often gives children a way into solving the problem.

$12 \div 4 =$

4 apples are packed in a basket.
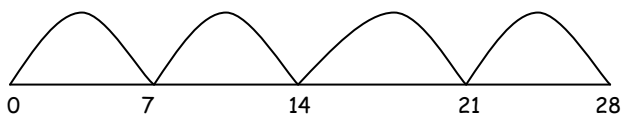How many baskets can you fill with 12 apples?

Grouping in 4

Dots or tally marks can either be shared out one at a time or split up into groups.

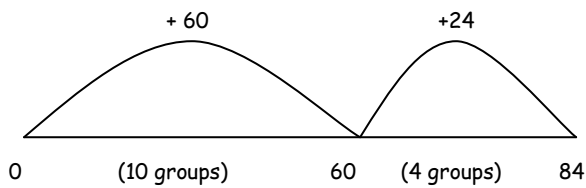$28 \div 7 =$

A chew bar costs 7p.
How many can I buy with 28p?

0   7   14   21   28

To work out how many 7's there are in 28, draw jumps of 7 along a number line.
This shows you need 4 jumps of 7 to reach 28

DIVISION

84 ÷ 6 = I need 6 drawing pins to put up a picture. How many pictures can I put up with 84 pins? +60 +24 0 (10 groups) 60 (4 groups) 84	It would take a long time to jump in sixes to 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 sixes.
192 ÷ 8 = 8 pencils fit in each pocket. If you have 192 pencils, how many pockets can be filled? 192 = 160 + 32 20 groups + 4 groups = 24	Is helpful to split 192 into sensible 'chunks' before dividing. As you are dividing by 8, the 'chunks' chosen must also be multiples of 8. Divide each 'chunk' (how many groups of 8?) and then add the answer together.
184 ÷ 7 = I need 184 chairs for a concert. I arrange them in rows of 7. How many rows do I need? 184 - 140 20 groups 44 - 42 6 groups 2 = 26 r 2	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.

COUNTING IDEAS

❖ Practice chanting the number names.
Encourage your child to join in with you. When they are confident,
try starting from different numbers – 4, 5, 6 etc.

❖ Sing number rhymes together – there are lots of commercial tapes
and CD's available.

❖ Give your child the opportunity to count a range of interesting objects
(coins, pasta shapes, buttons etc.) Encourage them to touch and move
each object as they count.

❖ Play games that involve counting (e.g. snakes and ladders, dice games,
games that involve collecting objects).

❖ Look for numerals in movement. You can spot numerals at home, in the
street or when out shopping.

❖ Cut out numerals from newspapers, magazines or birthday cards.
Then help your child to put the numbers in order.

❖ Make mistakes when chanting, counting or ordering numbers. Can your
child spot what you have done wrong?

❖ Choose a number of the week e.g. 5. Practise counting to 5 and on
from 5. Count out groups of 5 objects (5 dolls, 5 bricks, 5 pens).
See how many places you can spot the number 5.

REAL LIFE PROBLEMS

❖ Go shopping with your child to buy two or three items. Ask them to work out the total amount spent and how much change you will get.

❖ Buy some items with a percentage extra free. Help your child to calculate how much of the payment is free.

❖ Plan an outing during the holidays. Ask your child to think about what time you will need to set off and how much money you will need to take.

❖ Using a TV guide, ask your child to work out the length of their favourite programmes. Can they calculate how long they spend watching TV each day/each week?

❖ Using a bus or train timetable, ask your child to work out how long a journey between two places should take? Do you arrive earlier or later than you expected? How much earlier/later?

❖ Help your child to scale a recipe up or down to feed the right amount of people.

❖ Work together to plan a party or meal on a budget.

These are just a few ideas to give you a starting point. Try to involve your child in as many problem – solving activities as possible. The more 'real' a problem is, the more motivated they will be when trying to solve it.

Hopefully this booklet will have helped you to understand the way in which your child is being taught calculation at Highbury Primary School.

Please remember if you have any concerns or questions it's always best to talk to your child's teacher rather than pulling the child in different directions or worrying about the problem.

Lastly don't forget:

Maths is fun!

Please let us keep it that way !