

## Maths At School

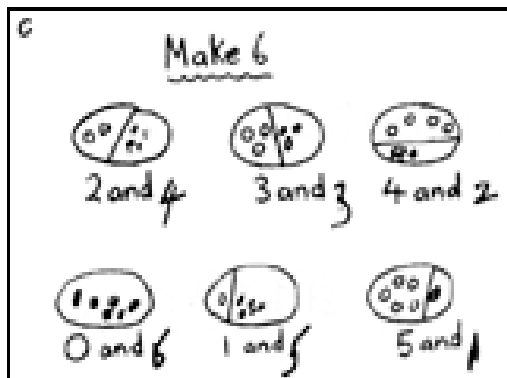
Children are taught Mathematics in accordance with the current National Curriculum (September 2014) at Gorefield Primary School. The key areas of Mathematics are place value, reasoning and problem solving; fractions, number fluency and number patterns; learning about shapes and directions; measuring length, weight and capacity and understanding charts and graphs. As teachers we are most frequently asked by parents how we teach written calculations so this will form the main part of this booklet. In number work children are encouraged to see if they can do a calculation mentally, first and foremost. If they can't then they select another method of working. Below is an outline of our formal written methods at Gorefield Primary School. **PLEASE NOTE** that each child is only moved onto the next stage when s/he is ready and that skipping stages can often have a very negative effect on a child's progress. Do check with your child's teacher to find out at what stage they are working within school.

### Progression in the Early years and Key Stage One (age 4-7 years)

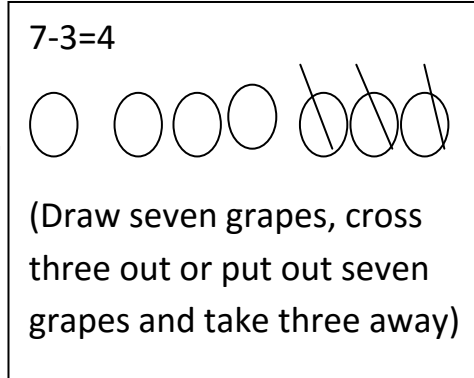
Children use practical equipment like counters and toy cars, for example, to help them with their calculations. It is crucial that they associate those strange squiggles called numbers with real items so they really understand what they mean. Children will draw pictures of calculations, count on their fingers and then progress to using a number line to record their calculations on paper.

### Step 1 Drawing pictures and using objects to count with.

#### Addition

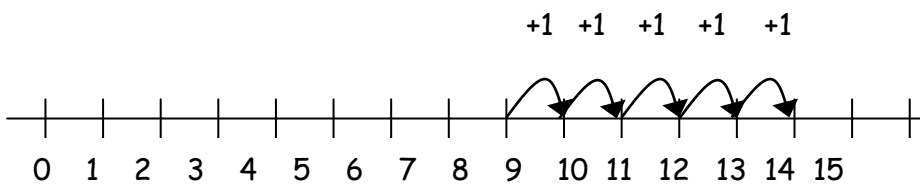


#### Subtraction



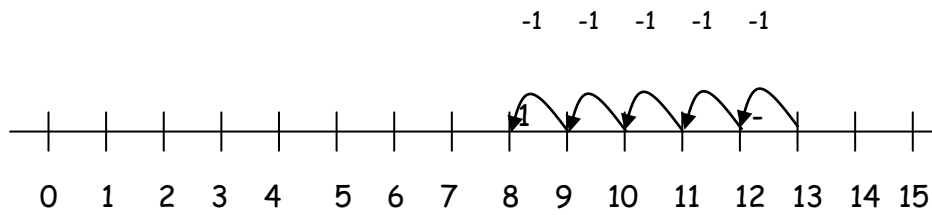
### Step 2 Using number lines to add and subtract in ones.

$$9+5 = 14$$



(Start at 9 and jump forwards five spaces to get to 14.)

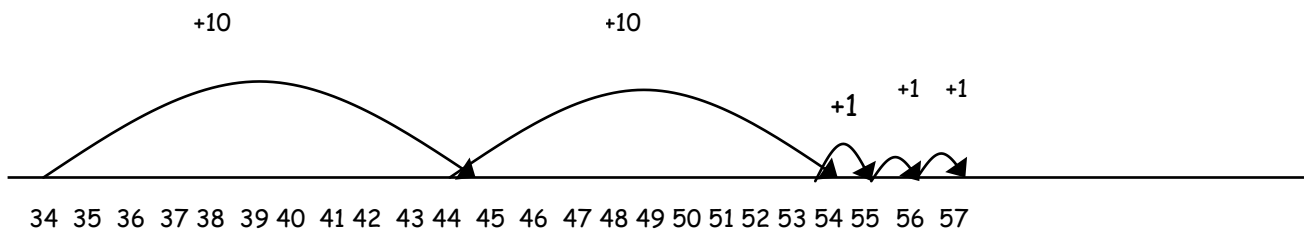
$13 - 5 = 8$



(Start at 13 and jump back 5 spaces to get to 8)

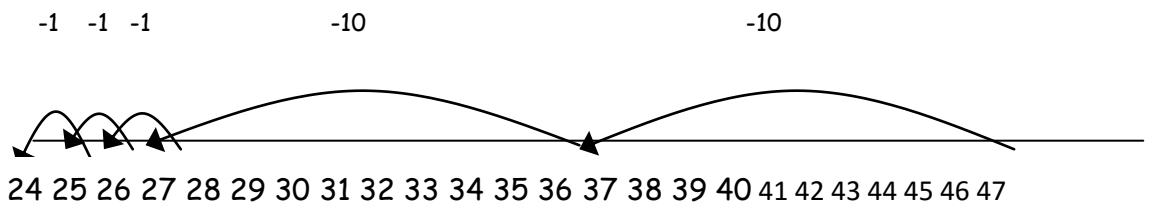
### Step 3 Using number lines to add and subtract in tens and ones.

$34 + 23 = 57$



( Start at 34, add on the tens and then the units to get the answer 57.)

$47 - 23 = 24$

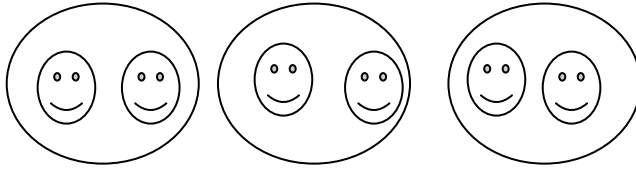


(Start at 47. take away the tens and then the units to get the answer 24.)

## Multiplication Tables in Key Stage One.

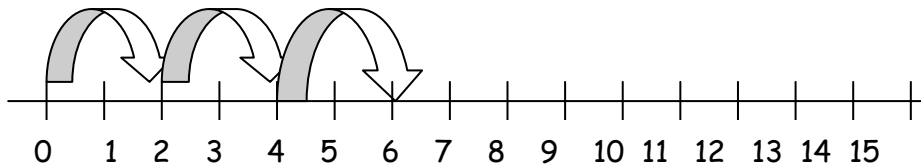
### Step 1

Children begin by grouping items into pairs (2's), then in tens and finally fives. So they may, for example, initially sort cakes into 3 groups of 2.



### Step 2

Children practice counting in 2's, (ie, 2,4,6,8,) then in 10's and 5's. Practising this with your child is really useful. By upper key stage one they understand that the multiplication sign is about grouping or repeated addition and they can record it on a number line.

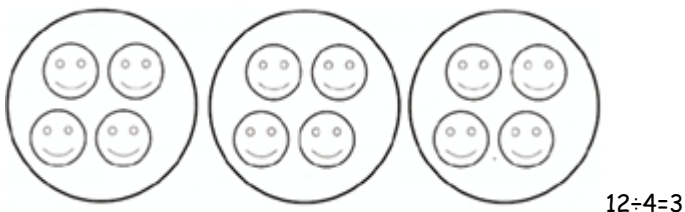


$$2+2+2=6 \quad \text{or} \quad 2 \times 3 = 6$$

## Division in Key Stage One.

### Step 1

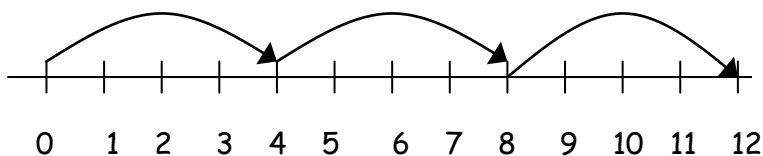
Children begin to understand equal groups and share items out in play.



### Step 2

By upper key stage one they usually are able to record division on a number line. Children use the knowledge that  $12 \div 4$  means how many groups of 4 make 12 and jump in fours along the number line to work out the answer. It takes 3 jumps so 3 lots of 4 make 12.

$$12 \div 4 = 3$$



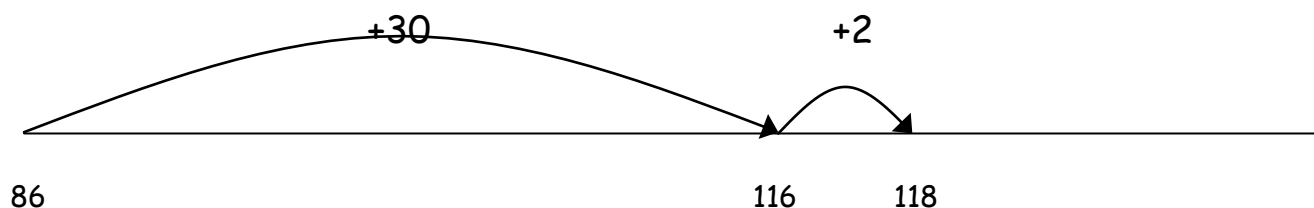
## Progression in Key Stage Two (age 7-11 years)

The examples below demonstrate the progression in calculation throughout key stage two. The aim nationally is for every child to become secure in a recognised formal written method for addition, subtraction, multiplication and division by the end of year 6. It is essential that children are well prepared for this by developing a strong understanding of place value and increasingly efficient mental and written calculation strategies so that they fully understand why the formal methods work. **Please check which method your child is being currently taught by their teacher to ensure a consistent approach. Thank you.** Please note there is a new requirement for all children to know all multiplication tables upto 12x12 by the end of year 4.

### Progression In Addition

#### Step 1 Number Line

$$86+32 = 118$$



Start at 86, count forwards 30 and then another 2 to get the answer 118.

#### Step 2 Expanded Addition

$$86+38= 124$$

$$\begin{array}{r} 80 \quad 6 \\ + 30 \quad 8 \\ \hline 110 + 14 \quad =124 \end{array}$$

#### Step 3 Short Addition

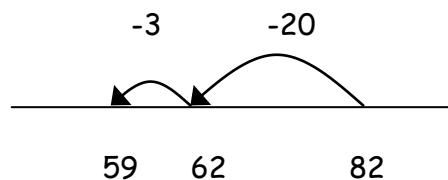
$$7648+1486=9134$$

$$\begin{array}{r} 7 \ 6 \ 4 \ 8 \\ + 1 \ 4 \ 8 \ 6 \\ \hline 9 \ 1 \ 3 \ 4 \\ 1 \ 1 \ 1 \end{array}$$

## Progression In Subtraction

### Step 1a Number Line (counting back)

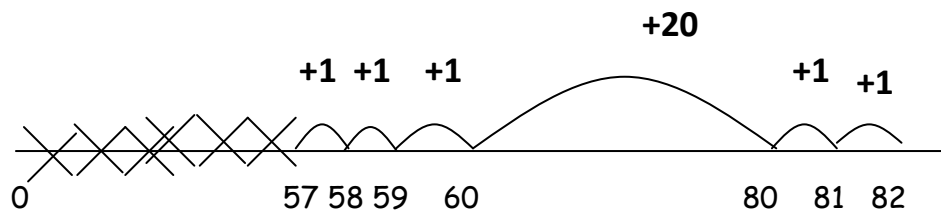
$$82 - 23 = 59$$



Start at 82, count back 20 and then another 3 to get the answer 59.

### Step 1b Number Line (counting forwards, used for a small difference)

$$82 - 57 = 25$$



Start at 57 and count up to 82 to find the difference **25**.

### Step 2 Expanded Subtraction

$$758 - 86 = 672$$

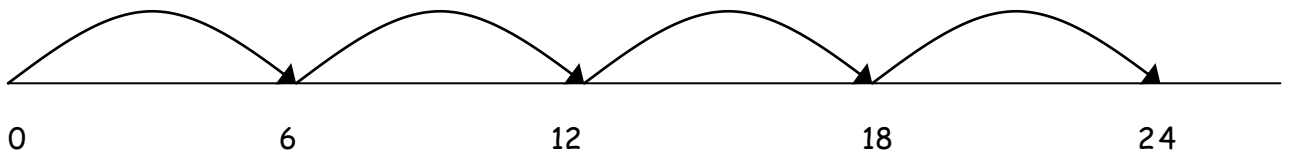
$$\begin{array}{r} 600 \quad 150 \\ \cancel{700} \quad 50 \quad 8 \\ - \quad \quad 80 \quad 6 \\ \hline 600 \quad 70 \quad 2 = 672 \end{array}$$

### Step 3 Short Vertical Subtraction

$$\begin{array}{r} 61 \\ \cancel{7}58 \\ - \underline{86} \\ \underline{672} \end{array} \qquad 758-86=672$$

## Progression in Multiplication

### Step 1 Number Line $6 \times 4 = 24$



(Start at 0, jump forwards 4 groups of 6 to get the answer 24.)

### Step 2 Short Methods

$8 \times 23 = 184$  (2 digit number  $\times$  1 digit number)

$$\begin{array}{r} \times \quad 20 \quad 3 \\ 8 \quad \boxed{160} \quad \boxed{24} \\ \hline \phantom{8} \quad \phantom{160} \quad 160 \\ + \quad \phantom{160} \quad \underline{24} \\ \hline \phantom{8} \quad \phantom{160} \quad \underline{184} \end{array}$$

(Partition 23 into 20 and 3, multiply the 8 by 20, then by 3. Take the answers and add them together to get the answer 184.)

This leads to Short Multiplication

$$\begin{array}{r} 23 \\ \times 8 \\ \hline 184 \end{array}$$

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Step 3 Long Methods

$38 \times 72 = 2736$

$$\times \quad 70 \quad 2$$

30	2100	60
8	560	16

$$\begin{array}{r} 2100 \\ + 560 \\ + 60 \\ + \underline{16} \\ \hline 2736 \end{array}$$

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(Both numbers are partitioned, multiplied together and then the answers to each multiplication are added together to get the final answer of 2736.)

This leads to:

5 1

3 8

$$\underline{\times 72}$$

$76 \quad (2 \times 38)$

$\underline{2660} \quad (70 \times 38)$

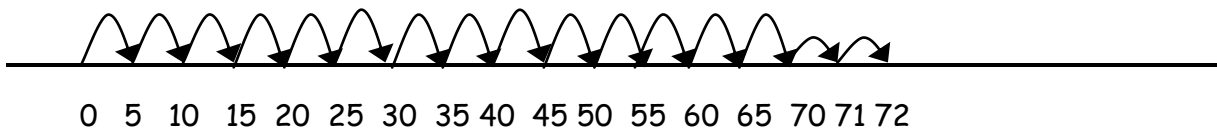
$\underline{2736}$

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# Progression in Division

## Step 1 Number Line

$$72 \div 5 = 14 \text{ r}2$$



(Using the understanding that  $72 \div 5$  means how many groups of 5 are in 72, start at 0 and count forwards in groups of 5. In the example there are 14 groups of 5 to make 70. It is not possible to make another group so the two left over become a remainder. The answer is therefore 14 remainder 2.)

## Step 2 Short Division $793 \div 3 = 264 \text{ remainder } 1$

$$\begin{array}{r} 264 \text{ r}1 \\ 3 \overline{) 793} \end{array}$$

## Step 3 Long Division

$$432 \div 15 = 28 \text{ r}12$$

$$\begin{array}{r} 28 \text{ r}12 \\ 15 \overline{) 432} \\ \underline{300} \quad (20 \times 15 = 300) \\ 132 \\ \underline{120} \quad (8 \times 15 = 120) \\ 12 \quad (\text{remainder } 12) \end{array}$$

Multiples of the divisor (15) have been subtracted from the dividend (432)

'20 (lots of 15) + 8 (lots of 15) = 28

12 is the remainder'