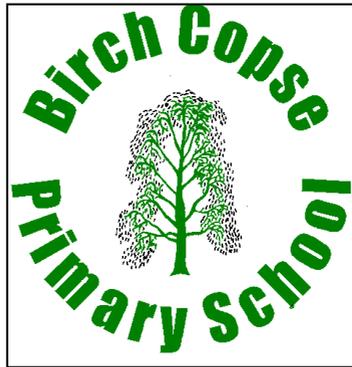


**Birch Copse Primary School**

**A Parents' Guide to Written  
Methods**

**Multiplication**



**June 2013**

# Aims of this Booklet.

This booklet aims to provide an outline of the written and mental methods that are taught in mathematics at Birch Copse Primary School.

The methods show progression from Level 1 to level 6.

Each year group may cover more than one method within class ensuring that children are taught according to their needs.

The methods shown here are taught to not only enable children to answer calculations but to also solve mathematical problems. We consider the using and applying of these skills critical to progressing in mathematics.

Remember to use the vocabulary 'number sentence' OR 'calculation' instead of 'sum'.

# Mental strategies to support written methods for Multiplication.

This list is progressive but any appropriate method may be used within a level.

- **Counting in groups of 2, 3, 5 and 10** ( 1, 3, 5.....6, 9, 12, 15..... 5, 10, 15, 20.....20, 30, 40)
- **Multiplication facts** (multiples of 5 always end in 0 or 5, multiples of 2,4 are always even, multiples of 9 have digits that add up to 9 or a multiple of 9)
- **Using known multiples to help calculate other multiples**
- **Making a number 10/100/1000 times bigger** (moving digits using a place value grid,  
 $3 \times 5 = 15$      $30 \times 5 = 150$ )
- **Making a number 10/100/1000 times smaller** (moving digits using a place value grid  
 $3 \times 5 = 15$          $0.3 \times 5 = 1.5$ )
- **Square numbers.**
- **Knowing factors** (Factors of 24 are 1,24, 2,12, 3, 8, 4, 6—numbers that 24 is divisible by or numbers that have 24 in their times table)
- **Knowing multiples** (e.g. multiples of 4 are numbers in the 4 times table - 4, 8, 12, 16....)
- **To know and use the times table facts to 10.**

# Level 1

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At level 1, the children can record their work in writing using pictures and diagrams.

## Written method examples and explanation:

At level 1, the children count sets of objects in 2s, 5s and 10s. They will use a variety of objects and resources to do this.



2



4



6



8

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The children will also solve number problems that include repeated addition, adding lots of the same number.

E.g. 3 children have 2 sweets each. How many sweets altogether?



$$2 + 2 + 2 = 6$$

The children would calculate the answer by counting in 2s, rather than counting then individually in 1s.

## Level 2

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At level 2, the children can record their work in writing and record their mental calculations as number sentences.

### Written method examples and explanation:

The children begin by linking multiplication to repeated addition, using the vocabulary 'lots of' or 'groups of' for x.

For example '4 x 2' would be said as '4 lots of 2'

2	+	2	+	2	+	2	=	8
4	x	2	=	8				

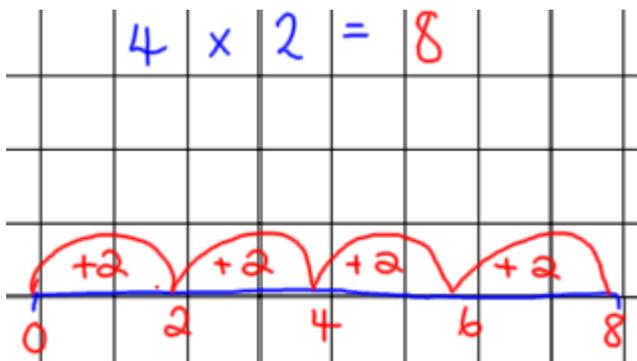
They then move on to drawing arrays to solve a multiplication problem.

Draw 4 lots of 2 crosses.

4	x	2	=	8
x	x			
x	x			
x	x			
x	x			

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They can also draw a number line to solve multiplication problems by drawing '4 jumps of 2'.



Within level 2, the children will learn the 2, 5 and 10 times table after learning these ways to work out the answer to multiplication number sentences. This is so they have a secure understanding of multiplication and what it involves.



# Level 4

At level Children can use short methods for  $\times$  and  $\div$ .  
Children can multiply a simple decimal by a single digit.  
e.g. calculate  $36.2 \times 8$

## Written method examples and explanation:

Column Multiplication single digit  $\times$  two digit number.

When multiplying explain that we are going to multiply all the digits by (in this case) 4, so:

	T	U			
	2	3			
$\times$		4			
	1	2	(3 $\times$ 4)		
+	8	0	(20 $\times$ 4)		
	9	2			

Remember:

Start from the right hand side.

Put largest digit on the top.

Calculate  $3 \times 4 = 12$ . Write 12 in the correct column.

Repeat with  $20 \times 4$ , (Calculate  $2 \times 4$  then make it ten times bigger)

Column Multiplication single digit  $\times$  three digit number.

	H	T	U		
	1	2	6		
$\times$			4		
		2	4	(6 $\times$ 4)	
		8	0	(20 $\times$ 4)	
+	4	0	0	(100 $\times$ 4)	
	5	0	4		

Remember:

When multiplying explain that we are going to multiply all the digits by (in this case) 4, so:

$6 \times 4$

$20 \times 4$  ( $2 \times 4$  make it 10 x bigger)

$100 \times 4$  ( $1 \times 4$  make it 100 x bigger)

Column Multiplication—decimals by a single digit number.

	T	U	.	$\frac{1}{10}$		
x	3	6	.	2		
		5	.	0		
		1	.	0	(0.2 x 5)	
	3	0	.	0	(6 x 5)	
	1	5	.	0	(30 x 5)	
	1	8	.	1	0	

Remember:

- Line digits up using place value.
- Use single digit terminology

e.g.  $2 \times 5 = 10$  then make it 10 times smaller because we are really doing  $0.2 \times 5$

OR  $3 \times 5 = 15$  then make it 10 times bigger as we are really doing  $30 \times 5$ .

- Next step—remove the calculation from the right hand side.

Column Multiplication carrying digits across, adding whilst multiplying.

	H	T	U
	5	7	8
x			4
	2	3	1
	2	3	2
	5	3	

Remember:

$$8 \times 4 = 32$$

Put 2 in the units column and carry the 3 into the tens column.

$$7 \times 4 = 28$$

Add on the 3 that you carried across = 31

Repeat...

# Level 5

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At level 5, the children can use all four operations with decimals to two places, e.g. *Multiply decimal numbers by a single digit, e.g.  $31.62 \times 7$*

Children can understand and use an appropriate non-calculator method for solving problems that involve multiplying any three digit numbers by any two-digit number.

## Written method examples and explanation:

Multiplying 2 digit numbers by 2 digit numbers.

		T	U		
		3	2		
	x	2	4		
			8	(2x4)	
	1	2	0	(30x4)	
		4	0	(2x20)	
	+	6	0	0	(30x20)
		7	6	8	

Remember:

- Remove the jottings from the right hand side when the children are ready.

## Multiplying two digit numbers by two digit numbers.

		T	U	
		3	2	
	x	2	4	
		1	2	8
+		6	4	0
<hr style="border: 1px solid green;"/>				
		7	6	8

Remember:

$$2 \times 4 = 8$$

$3 \times 4 = 12$  (Remind the children that we have made it tens times bigger as the calculation is  $30 \times 4$  really—refer to place value of digits)

Then put a zero in the units column as we move onto multiplying by the tens number in this case 2 (or 20) in 24

Continue process then add the two totals together.

## Multiplying three digit numbers by two digit numbers.

			8	2	7	
		x		4	6	
			4	9	6	2
+	3	3	0	8	0	
<hr style="border: 1px solid blue;"/>						
	3	8	0	4	2	

Remember:

$$7 \times 6 = 42$$

Put 2 in the units column and carry the 4 into the tens column.

$$2 \times 6 = 12$$

Add on the 4 that you carried across = 16

Repeat...

## Multiplying decimal numbers by single digits.

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		T	U	$\frac{1}{10}$	$\frac{1}{100}$
		3	1	6	2
	x		5	0	0
			0	1	0
			3	0	0
			5	0	0
+	1	5	0	0	0
	1	5	8	1	0

Remember:

- Start from the right hand side.
- Write a 'dotted zero' for a place holder (if needed)
- Line up decimal points and digits,

Next step: multiply decimals using the same methods as on page 12.

(Carrying as you go)

## Level 6

### Written method examples and explanation:

Children should be able to use methods for level 5, using decimals and integers of any size.