



Parents' Information Leaflet:

Key Stage 1

Mathematics

Mathematics is both a key skill within school, and a life skill to be utilised throughout every person's day-to-day experiences.

Mathematics teaches us how to make sense of the world around us through developing a child's ability to calculate, to reason and to solve problems.

Why do we teach maths?

The aims of teaching mathematics at Cockfield Primary School are:

- To ensure children have a secure knowledge of number facts and a good understanding of the four operations of number (i.e., addition, subtraction, multiplication and division) and be able to apply them to real life situations, solve problems and make decisions.
- To communicate information and ideas to tackle a range of practical tasks, decision making and solving problems.
- To be able to attempt calculations mentally, where appropriate.
- To be able to use a reliable written method to solve calculations and problems.
- To develop an ability to think logically and clearly with confidence, and to develop enthusiasm and enjoyment when learning about maths.

The aim of this booklet is to inform parents and carers about some of the different methods used in school to teach mathematics and to provide tips for continuing the development of maths at home.

We hope you find it useful. If you would like further information on how your child is learning maths, please do not hesitate to contact your child's class teacher.

How are mathematical calculations taught?

All four calculation methods are taught in Key Stage One (Addition, Subtraction, Multiplication and Division). We follow the guidance set out in the National Curriculum. Your children will be taught, and asked to use, a number of mental and written methods to solve these calculations, moving from informal to formal methods as the key stage progresses.

Informal methods - Use of number lines, grids and other visual or concrete (physical) apparatus.

Formal methods - Written calculation methods for the four operations.

(There is further explanation of these methods in the booklet).

Beginning in EYFS, and continuing through early year 1, children will begin calculating through using concrete methods such as: cubes, counters or any other appropriate physical objects such as coins or real-life objects. In Year 1 they then begin to use support materials such as hundred squares, number lines and drawings to aid their calculating before starting to use written methods to calculate leading to more formal methods in Year 2. Throughout, concrete apparatus may still be used to support the teaching of new methods but by the end of Year 2 the aim is that most children will be able to perform small calculations without using physical support materials.

It must be stressed that the new national Key Stage 1 SATs tests (that are taken at the end of Year 2) do not allow for the use of any physical support materials.

Addition and Subtraction

Key Stage 1 Vocabulary: +, -, =, <, >, *addition, add, more, greater, counting on, counting in 1's, 10's, number bonds, number facts, fact families, doubles, part, whole, altogether, bridging through 10, multiples of 10, number facts, partitioning, tens, units/ ones, carrying and borrowing.*

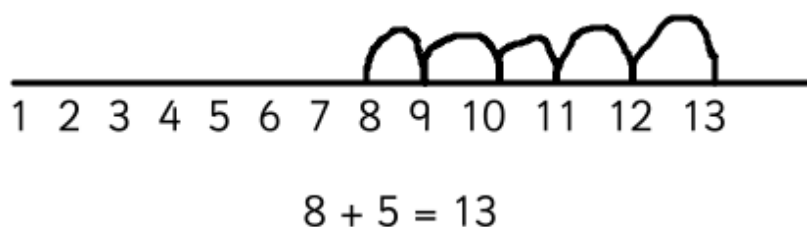
Beginning in Reception, and continuing through Year 1, the emphasis is on developing mental calculation strategies that may be supported by counting apparatus and using informal written methods. At this point they also use pictures to represent their calculations and working and are able to explain these orally.

Children start by using fingers or cubes to work out calculations on their own, or with a partner, firstly by counting all the objects in a group and then by counting on or back from a given number. They are also taught how it is more effective to begin calculating from the largest number.

They then progress to using number lines or hundred squares to help them perform calculations during Year 1. On a number

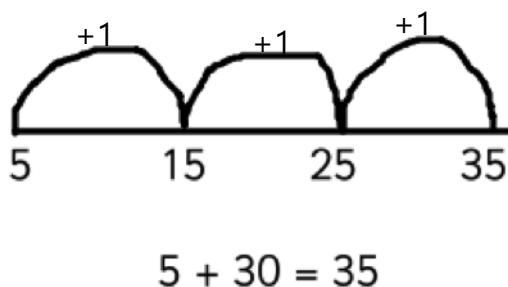
line, or hundred square, they point to the starting number and then move forward or backwards the required number of steps.

On number lines calculations are always presented HORIZONTALLY, not vertically.



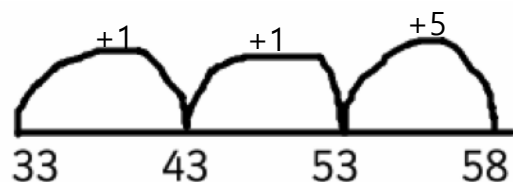
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Children then learn to use this method to add on or count back in jumps of ten and then multiples of tens.



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

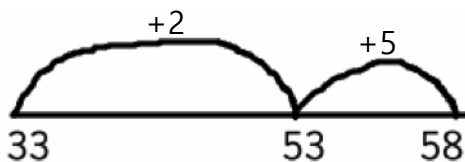
The goal of using this method is to clarify and aid mental calculations and, ultimately, be able to add or subtract two digit numbers from one another quickly through partitioning numbers into jumps of tens and units. In these mental calculations we first deal with the tens, then the units. The reason we do this is because it is an efficient mental calculating strategy.



$$33 + 25 = 58$$

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

Once counting on multiple jumps of ten is secure. Children will then be encouraged to simply add the tens and then the units.



$$33 + 25 = 58$$

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

Eventually children should be able to internalize these methods. That is, do them in their head without the support of apparatus or jottings.

Written Methods

After these methods are secure then standard written methods of addition and subtraction will become the main focus for development in early Year 2 as they are reliant and efficient procedures for dealing with larger numbers and will allow greatest mathematical achievement in Key Stage 2.

Addition of two-digit numbers to two-digit numbers is taught in Year 2, first without carrying and applying the skill to problem solving. Then carrying is introduced and, once mastered, is also applied to problem solving. Neat working is essential.

	2	3	
+	4	6	
	6	9	

	2	4	
+	4	8	
	7	2	
	1		

Subtraction of two-digit numbers from two-digit numbers is taught first without borrowing from the tens column and applying the skill to problem solving. Then borrowing is

introduced and, once mastered, is also applied to problem solving.

	8	6	
-	5	4	
	3	2	

	7		
	8	¹ 6	
-	5	9	
	2	7	

Multiplication and Division

Key Stage 1 Vocabulary: \times , \div , $=$, lots of, groups of, times, multiply, multiplied by, product of, multiple of once, twice, three times... ten times... repeated addition, array, double, halve, share, share equally, one each, two each, three each... group in pairs, threes... tens, equal groups of, divide, divided by, divided into, left, left over, remainder, fraction of, $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{3}$, and $\frac{3}{4}$ of.

Early multiplication skills begin in reception with counting in different steps.

Children in Year 1 begin with repeated addition of a number to undertake multiplication, for example:



$$5 \times 3 = 15$$

The same process is also used for undertaking division and allows children to begin to see that multiplication and division are opposites of each other.



$$15 \div 3 = 5$$

This method is also used to show the relationship between division and fractions and to find fractions of whole numbers, like so:

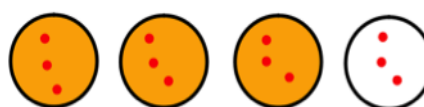


$$\frac{1}{3} \text{ of } 15 = 5$$

In year 2 this method is developed further to find fractions of numbers where there will be remainders and also to find $\frac{3}{4}$ of numbers, like so:



$$\frac{1}{3} \text{ of } 16 = 5 \text{ r } 1$$

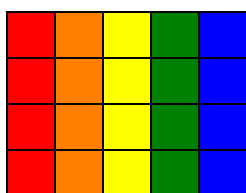


$$\frac{3}{4} \text{ of } 12 = 9$$

(found by counting the amount in 3)

As a school we expect the children at the end of Year 1 to know the 10x times table and the 2x table. **By the end of Year 2 it is a national expectation to know the 2, 3, 5 and 10 times tables by heart** and be able to recall and use facts and related division facts from these tables quickly.

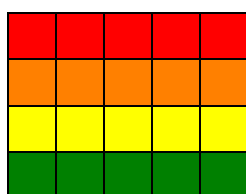
Arrays are another pictorial representation that can be used to help children learn times tables and allow children to know that multiplication can be done in any order. It is important that a child knows that 5×4 , for example, gives the same answer as 4×5 .



$$5 \times 4 = 20$$

(5 groups of 4 make 20)

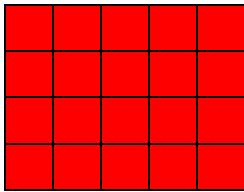
Arranged differently this same array can show the corresponding multiplication fact.



$$4 \times 5 = 20$$

(4 groups of 5 make 20)

By the end of year 2 children are expected to know multiplication facts and the corresponding division facts by heart so, again, arrays can help to establish this relationship. This one array can represent all of these facts:



$$5 \times 4 = 20$$

$$4 \times 5 = 20$$

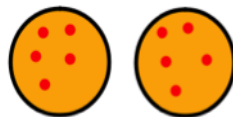
$$20 \div 4 = 5$$

$$20 \div 5 = 4$$

Children should use their multiplication facts and these methods to help work out calculations and problems. An example of a one step problem could be:

Sam shares out 20 sweets between his dad and himself. How many sweets do they get each?

Children need to recognise that the calculation should be:

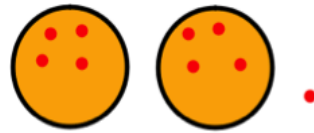


$$20 \div 2 = 10$$

The next step would be to undertake two-step problems. An example of which could be:

Sam shares out 9 sweets between his dad and himself. How many sweets do they get each? How many sweets are left over?

Children need to recognise that the calculation should be:



$$9 \div 2 = 4 \text{ r } 1$$

(the answer shows that the child can answer both parts of the question)

We understand that parents will naturally want to help their children learn their times tables and the associated multiplication and division facts. Here are some activities that may help:

- Counting and chanting tables in different ways- reap, singing, different voices (deep, squeaky, whisper)
- Have a tables fact of the day, or fact of the week. At breakfast or meal times ask what's 5 times 2? Then at another time of the day ask it again.
- Roll 2 dice and multiply the numbers. You may need to adapt the dice and put stickers on.
- Ask children to match the multiplication fact with an answer card.
- Rhymes and stories which involve counting in twos or fives ('One, two, three, four, five, once I caught a fish alive...'), or counting forwards or backwards in different intervals from a given starting number, help to develop familiarity with number
- Practise, practise, practise! However, little and often is usually the best way to learn and try to making learning tables FUN!

Useful websites:

- <http://nrich.maths.org/public/>
- <http://www.bbc.co.uk/schools/ks2bitesize/maths/number.shtml>
- <http://www.teachingtime.co.uk/>
- <http://www.teachingtables.co.uk>
- <http://www.bbc.co.uk/schools/laac/menu.shtml>
- <http://www.woodlandsjunior.kent.sch.uk/interactive/literacy/index.htm>
- <http://www.coxhoe.durham.sch.uk/>
- <http://www.sheppardsoftware.com/math.htm> (great activities for developing rapid recall, particularly the 'fruit splat' game but will not work on iPads).

Written Methods

In Year 2 we aim to introduce written methods for short multiplication and division but this will only be done once the teacher is confident that a child has a fairly secure rapid recall of their multiplication facts.

Multiplication will be introduced without carrying for the tables learnt first, with carrying introduced afterwards. Once mastered, this method will be applied to problem solving. As with addition and subtraction, neat working is essential.

	2	3	
	x	2	
	<hr/>	<hr/>	
	4	6	
	<hr/>	<hr/>	

	2	7	
	x	2	
	<hr/>	<hr/>	
	5	4	
	<hr/>	<hr/>	
	1		

Only with a good rapid recall of multiplication facts will written methods for division be introduced. Up until this point grouping (as shown above) will continue to be taught as the preferred method for division until Year 3. However, the grouping method is less than ideal for working with larger numbers as it is time consuming and there is a good chance that children will lose count with larger numbers.

For the written method division with no remainders will be introduced first. Following this, division with remainders at the end will be taught. Then division with internal remainders taught and finally division with both internal remainders and those at the end.

	3	2	
2	<hr/>	<hr/>	
	6	4	

	3	2	r1
2	<hr/>	<hr/>	5 ⁴

	3	7	
2	<hr/>	<hr/>	7 ⁶ 14

	3	7	r1
2	<hr/>	<hr/>	7 ⁶ 5 ¹⁴

We hope you have found this information useful.
If you would like more clarification then please do not
hesitate to come into school and speak to us.

Mr Petty