



BRIZE NORTON PRIMARY SCHOOL



**A PARENT'S GUIDE TO
HOW MATHS IS TAUGHT**

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Why does Maths look different these days?

A parent's guide to the way maths is taught

Why have we done this?

Many parents have asked for something they can have at home to refer to when helping their children. This booklet aims to help parents/carers understand the stages in the calculation methods we use.

By the end of Year 6, most children will be using methods that will be familiar to parents from their own school days, but they may not know the steps along the way to this. We are teaching for understanding at every step along the way.

M. Smith

Number in the Foundation Stage

By the end of the Foundation Stage (Reception year) most children will:

- say use number names in order in familiar contexts
- count reliably up to 10 everyday objects
- use language such as 'more' or 'less' to compare two numbers
- find one more or less than a number from 1 to 10
- begin to relate addition to combining two groups of objects and subtraction to 'taking way'
- use mathematical ideas and methods to solve practical problems

Some children will be able to:

- recognise, count, order, write and use numbers up to 20

A few children will be beginning to:

- use a range of strategies for addition and subtraction, including some mental recall of number bonds

The teaching of mathematics in the Foundation Stage is through a play based approach. Children learn through a range of practical contexts using images, objects, stories, rhymes and songs. Children will be introduced to number lines and tracks to develop their understanding of the number system and to support calculation.

Addition and Subtraction

Stage 1

Most children use practical contexts to develop their understanding of more and less when adding and subtracting.

They will use money to carry out addition and subtraction with numbers up to 10, e.g.

- I put 4 pennies in my purse. I add another 3. How many pennies are in my purse now?
- If I take out 2 pennies, how many pennies are left in the purse?

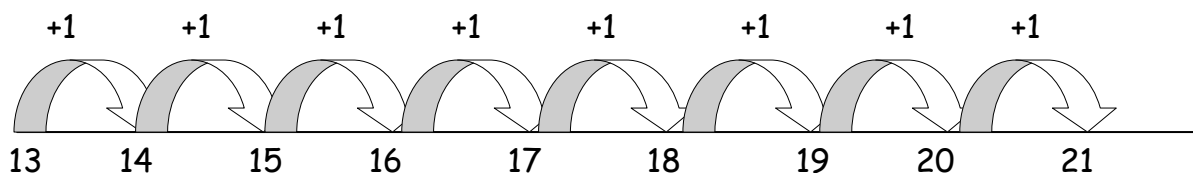
At this stage recording is often demonstrated by the teacher through practical contexts. Children are encouraged to explore ways of recording their thinking often in pictorial form.

Children use number tracks and objects to count forwards and backwards.

0	1	2	3	4	5	6	7	8	9	10	11
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When children are confident with using a number track, a number line is introduced and children are encouraged to mark the jumps they are making.

$$13 + 8 = 21$$



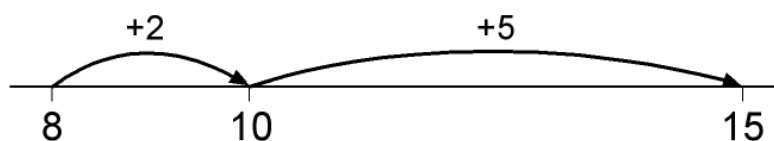
Stage 2

Most children will be working with numbers up to 100. When they are confident using a number line, they will be introduced to a blank number line as a way of showing their thinking.

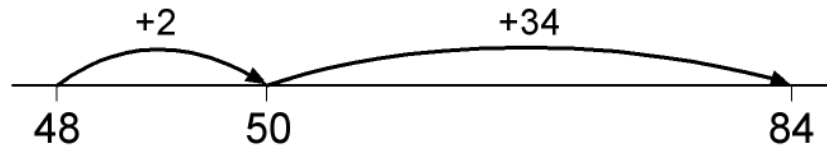
Addition:

Moving towards counting to the next ten.

$$8 + 7 = 15$$



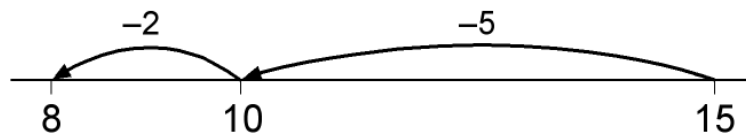
$$48 + 36 = 84$$



Subtraction:

Children will use a number line to count back or forward to find the *difference* between two numbers.

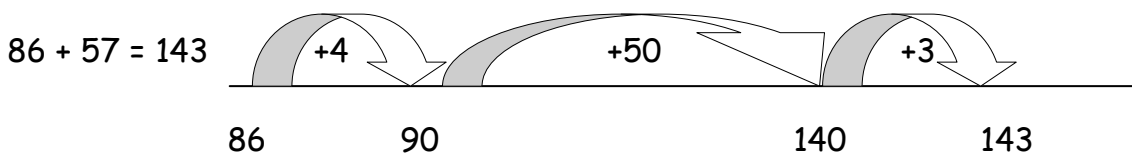
$$15 - 7 = 8 \quad (\text{What is the } \textit{difference} \text{ between 8 and 15?})$$



Stage 3

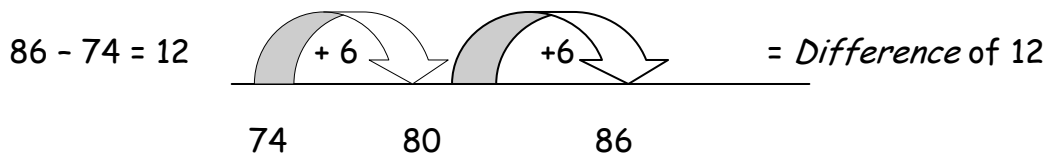
Most children will be working with whole numbers up to 1000.

Calculations will be presented horizontally and children are encouraged to use strategies they have learnt earlier but with bigger numbers.

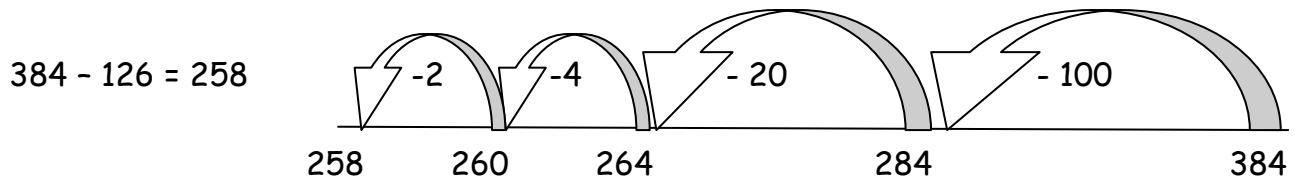


Here children are encouraged to *partition* the units, count on to the next ten, count on in tens and then add the remaining units. Working in this way develops children's confidence in mentally *bridging* a tens number.

Number lines are an important way to help most children see the stages in a calculation. We often count on from the smaller number to work out a subtraction with a small *difference*.



Or we count back to subtract numbers with a large *difference*.



Children are taught both subtraction methods and are then encouraged to decide which method would be the most efficient, depending on the given calculation.

Stage 4

When children are ready, we begin working recording mental methods using *partitioning for addition*. This is usually in Year 3.

$$\begin{array}{r} 47 \\ + 76 \\ \hline \end{array} = \begin{array}{r} 40 + 7 \\ 70 + 6 \\ \hline 110 + 13 \\ \hline 123 \end{array}$$

By the end of Year 3, if the children are ready, we develop column addition using *expanded methods*. This is only taught at this stage if children are confident in *place value* and can accurately record their working in columns.

$$\begin{array}{r} 67 \\ + 24 \\ \hline 11 \\ 80 \\ \hline 91 \end{array}$$

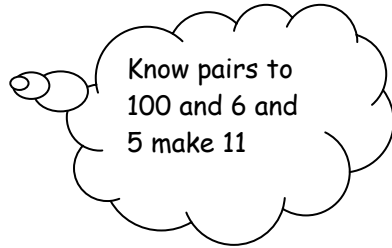
$$\begin{array}{r} 267 \\ + 85 \\ \hline 12 \\ 140 \\ 200 \\ \hline 352 \end{array}$$

Add the units, then the tens and then the hundreds.
No carrying at this stage.

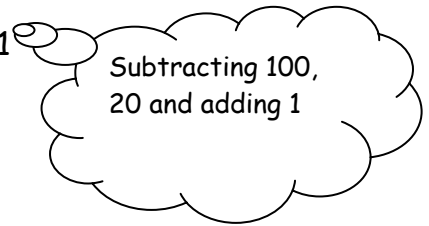
Stage 5

Most children will be working with whole numbers up to 10,000. They will continue to work things out in their heads if the numbers allow:

$$76 + 35 = 111$$



$$640 - 119 = 521$$



Usually by the end of Year 4, children begin to work on "carrying" number below the line when using vertical addition.

$$\begin{array}{r}
 521 \\
 + 486 \\
 \hline
 7 \\
 100 \\
 900 \\
 \hline
 1007
 \end{array}
 \quad \longrightarrow \quad
 \begin{array}{r}
 521 \\
 + 486 \\
 \hline
 1007 \\
 1
 \end{array}$$

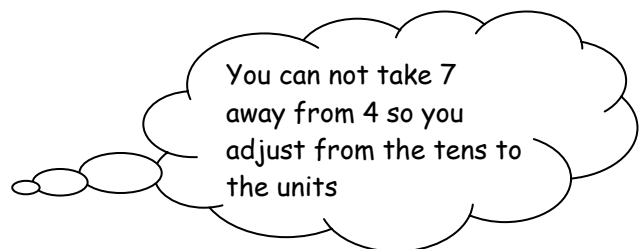
The carrying below the line is only taught when the children are accurately using the *expanded method* above. Some children at this stage may still need the support of the number line.

For subtraction, number line work continues. Most children are introduced to an *expanded method* of working in preparation for vertical subtraction. This involves partitioning numbers into hundreds, tens and units.

$$\begin{array}{r}
 567 - 243 = \\
 \quad 500 + 60 + 7 \\
 \quad - 200 + 40 + 3 \\
 \hline
 \quad 300 + 20 + 4 = 324
 \end{array}$$

As children become confident with subtracting larger numbers they are introduced to *decomposition*.

$$\begin{array}{r}
 784 - 67 = \\
 \quad 700 + 80 + 4 \\
 \quad - \quad 60 + 7 \\
 \hline
 \quad 700 + 70 + 14 \\
 \quad - \quad 60 + 7 \\
 \hline
 \quad 700 + 10 + 7 = 717
 \end{array}$$



Stage 6

Most children will begin working with decimal numbers, usually in money or measures contexts, as well as whole numbers.

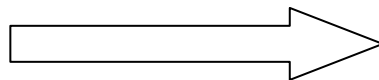
The method of carrying is used when children are ready. The *expanded method* may still be used.

$$\begin{array}{r} 3587 \\ + 675 \\ \hline = 4262 \\ \hline 111 \end{array}$$

$$\begin{array}{r} \text{£}35.87 \\ + \text{£} 6.75 \\ \hline 12 \\ 1.50 \\ 11.00 \\ 30.00 \\ \hline \text{£} 42.62 \\ \hline \end{array}$$

Decomposition is then introduced as the main method for subtraction.

$$\begin{array}{r} 754 \\ - 286 \\ \hline \end{array} = 700 + 50 + 4 \\ = 200 + 80 + 6 \\ = 600 + 140 + 14 \\ = 200 + 80 + 6 \\ \hline 400 + 60 + 8 = 468$$



$$\begin{array}{r} 6 \ 14 \ 14 \\ \cancel{7} \ \cancel{5} \ 4 \\ - 286 \\ \hline 468 \end{array}$$

Stage 7

Most children will be working with decimal and whole numbers, sometimes mixed in the same calculations using the column method.

Addition of decimals will include numbers with different decimal places:

$$401.2 + 26.85 + 0.07 =$$

$$\begin{array}{r} 401.2 \\ + 26.85 \\ + 0.07 \\ \hline 428.12 \\ \hline 11 \end{array}$$

Subtraction is extended to work with decimals, using *decomposition*:

$$324.9 - 7.25 =$$

$$\begin{array}{r} 1\ 14\ 8\ 10 \\ 3\ ~~2~~4.\ ~~9~~0 \\ - \quad 7.25 \\ \hline 317.65 \end{array}$$

Children will still be encouraged to use mental methods, rather than pencil and paper, where the numbers are appropriate.

Multiplication and Division

Stage 1

Most children use practical contexts to count in steps of 10 to 100. They count to 50 saying how many tens they counted on their fingers. This will extend to counting in steps of 2 and 5 over the year.

Most children will explore simple multiplication through counting how many toes on two feet, how many gloves in three pairs etc. Their working will be mainly recorded by the teacher and in pictorial form.

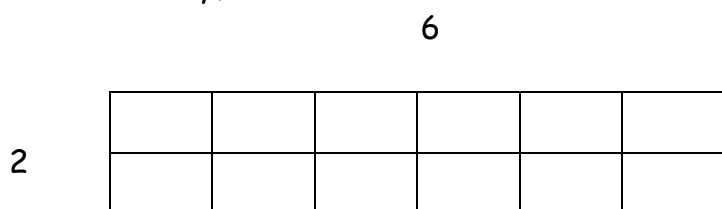
Stage 2

Children should learn multiplication facts for the 2, 5 and 10 times tables. Most will learn to double numbers to 10 and develop an understanding that halving is the inverse of doubling.

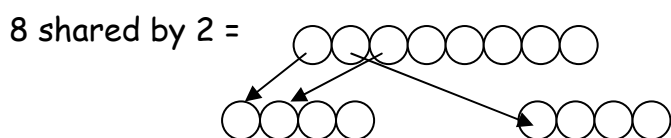
Most children use the symbols of multiplication and division in number sentences. When multiplying they record their working as repeated addition,

$$6 \times 2 = \quad (6 \text{ groups of } 2) = \quad 2+2+2+2+2+2 = 12$$

or as an array,



Children understand division as grouping or sharing.



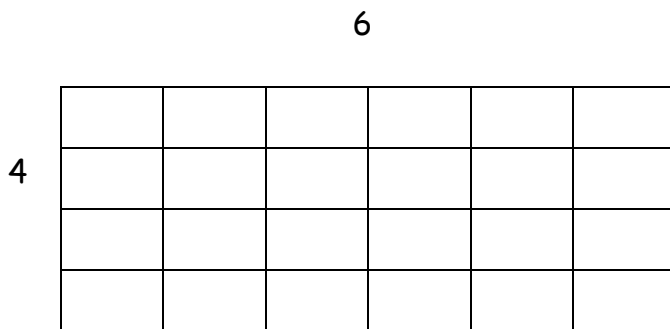
Stage 3

Usually by the end of the Year 3, most children will know their 2, 3, 4, 5, 6 and 10 times tables and the corresponding division facts.

Written recording helps most children to understand that multiplication and division are about equal size groups:

So: 6 groups of 4 is the same as $4+4+4+4+4+4$

This can be understood as an array.



This array helps us to see that, $6 \times 4 = 24$ and $4 \times 6 = 24$

but also that $24 \div 4 = 6$ and $24 \div 6 = 4$

It also helps children to see that once they know one fact, they have three "freebie" facts. I know $6 \times 6 = 36$ so I know that $36 \div 6 = 6$.

Number lines are used for division by counting in equal steps, using *remainders* by the end of year 3.

$$19 \div 3 =$$



How many threes are there in 19? 6 jumps and 1 left over.

Stage 4

Most children will know their multiplication facts up to 10×10 and the corresponding division facts. This is usually by the end of Year 4.

Working with patterns and relationships can help children to understand and remember new facts:

- Use doubling of the four times table to get the eight times table, e.g. $5 \times 4 = 20$ so 5×8 is 40.
- Halving and doubling patterns; knowing that because $10 \div 2 = 5$ then $100 \div 2 = 50$ and that $6 \times 2 = 12$ so $60 \times 2 = 120$.

Understanding of *place value* is used to *partition* numbers for multiplication using the informal recording and the grid method:

$$\begin{array}{r}
 43 \\
 40 + 3 \\
 \downarrow \quad \downarrow \quad \times 6 \\
 240 + 18 = 258
 \end{array}$$

38×7 can be thought of as 'seven lots of thirty' and 'seven lots of eight'. Children use their knowledge of 3×8 to calculate 30×8 .

×	7
30	210
8	56
	266

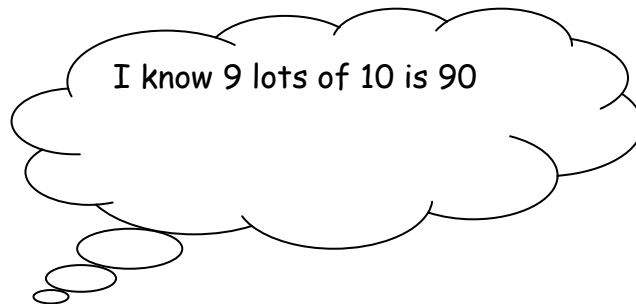
When dividing, children are taught to partition numbers using their knowledge of multiplication facts. They are encouraged to informally record:

$$84 \div 7 =$$

$$\begin{array}{r}
 84 \\
 70 + 14 \\
 \downarrow \quad \downarrow \quad \div 7 \\
 10 + 2 = 12
 \end{array}$$

Usually by the end of Year 4, if appropriate, children are introduced to the *chunking* method

$$\begin{array}{r}
 9 \overline{)97} \\
 - 90 \\
 \hline
 7
 \end{array}
 \quad
 \begin{array}{l}
 9 \times 10 \\
 \text{Answer: } \quad 10 \text{ R } 7
 \end{array}$$



Stage 5

Multiplication is taught using the grid method to multiply two-digit and three-digit numbers. As the children are ready, an *expanded* column method is introduced.

×	20	7	
50	1000	350	1350
6	120	42	162
			1512

	56	
×	27	
	1000	50 × 20 = 1000
	120	6 × 20 = 120
	350	50 × 7 = 350
	42	6 × 7 = 42
	<u>1512</u>	
	1	

Understanding of division is built up through "chunking". The choice of appropriate "chunks" makes the calculation easier.

$$\begin{array}{r}
 6 \overline{)196} \\
 \underline{- 60} \quad 6 \times 10 \\
 136 \\
 \underline{- 60} \quad 6 \times 10 \\
 76 \\
 \underline{- 60} \quad 6 \times 10 \\
 16 \\
 \underline{- 12} \quad 6 \times 2 \\
 4 \quad 32 \\
 \text{Answer: } \quad 32 \text{ R } 4
 \end{array}$$

Stage 6

Children will be working on multiplication and division of whole numbers and decimals. When using written methods of working, children may still use the grid method but if appropriate will be introduced to expanded vertical multiplication.

Expanded short multiplication to short multiplication:

346	
×	9
54	(9 × 6)
360	(9 × 40)
2700	(9 × 300)
<u>3114</u>	

346	
×	9
<u>3114</u>	45

When dividing, children will continue to use the chunking method with whole numbers and decimal numbers. Children will be encouraged to reduce their workings.

$$\begin{array}{r} 6 \overline{)196} \\ - 180 \quad 6 \times 30 \\ \hline 16 \\ - 12 \quad 6 \times 2 \\ \hline 4 \quad 32 \\ \text{Answer:} \quad 32 \text{ R } 4 \end{array}$$

Stage 7

If ready, children are taught short division.

$$\begin{array}{r} 97 \\ 3 \overline{)2921} \end{array}$$

Helping your child

DO:

- Let them have a go on their own if they ask you, BUT ...
- ... let your child know that you are around to give help if they would like it.
- Listen to your child; let them teach you their method.
- Make practice fun, for example card games.
- Put aside a regular 10 minutes several times a week for them to tell you what they are working on.
- Try to find opportunities to show them maths being used at home or shopping, e.g. measuring quantities of food, using money etc.
- Use mathematical vocabulary that you children know and bring home rather than terms you may remember e.g. borrowing when subtracting is no longer a term used as nothing is ever repaid!

DON'T:

- Put pressure on your child accidentally. Maths is not just about knowing a fact at split second notice.
- Point out all the mistakes, instead give encouragement and praise for having a go.

Glossary of Terms

Bridging - You can make it easier to use numbers if you work out what should be added or taken away to bring you to a 10 or *multiple* of 10. Then add or subtract the other number separately.

Decomposition - To partition numbers in different ways to allow subtraction to take place when the subtracting number is larger than the starting number e.g. $700+80+4$ is the same as $700+70+14$. (what you may know as borrowing)

Difference - One number subtracted from another gives you the difference between them.

Expanded methods - To carry out an operation such as addition or subtraction on a partitioned number.

Multiples - Lots of the same number. Multiples are like multiplication tables. e.g. the multiples of 5 include 5, 10, 15, 20.....

Partitioning - To split numbers in various ways such as into hundreds, tens and units to make calculations easier.

Place Value - The value of a digit within a number. e.g. The value of 2 in 524 is 20.

Remainder - The number left when you cannot equally divide (share).