Helping your child with mathematics

Autumn 2015

INTRODUCTION

It is widely recognised that parents and carers play a vital role in helping their children to achieve success at school.

This handbook has been written to give you an insight into the mathematics your child will learn at Fordbridge Community Primary School. It aims to provide useful information and ideas of how you can help your child at home to support their mathematical learning.

The mathematics work your child does at school may look different to the kind of work you remember from when you were at school. Children are encouraged to work mentally where possible, using personal jottings to support their thinking. The written methods many adults learned 'by heart' will be introduced once children have a good basic understanding.

The first part of the booklet shows the stages your child will go through when learning to add, subtract, multiply and divide numbers. It will explain key methods used and share some of the vocabulary your children will be using in relation to their learning.

The second part of the booklet shows some of the key learning points within fractions, geometry (shape), measure and statistics (handling data).

The final part of the booklet gives suggestions of activities you could try at home. It is likely that you are already doing lots of things at home that are helping your child's mathematical development.

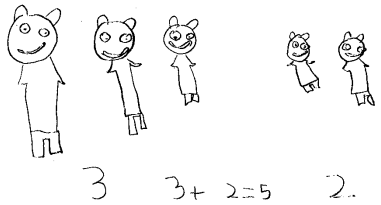
A glossary of terms has been added to help you familiarise yourself with the language and images that your children will be using on a day to day basis.

We hope this booklet is useful to you, and would welcome your feedback.

ADDITION

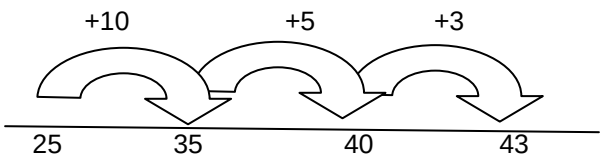
Initially children will be practising number formation, and taking part in practical activities where they will learn to count objects, matching to the written numerals. Children will start to add, or combine groups of objects from a very young age. They learn that combining two sets will give more, and they are shown how they could represent this on paper using pictures and simple number sentences.

I had 3 bears and was given 2 more. How many bears do I have now?



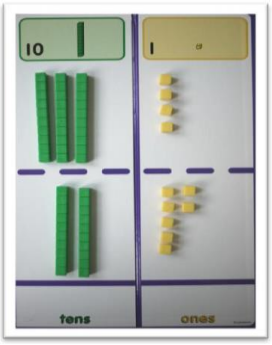
Before formal written methods are introduced, children are first taught methods that allow them to work out an answer in their heads. They use equipment to help them, such as cubes or counters. Number lines are used to help children record what has gone on in their head.

My plant was 25cm tall, but has grown another 18 cm. How tall is it now?



ADDITION

When ready, children in Year 2 will start to work more formally in columns, with practical equipment. They will use balloons, straws and other mathematical equipment to carry out a formal written method practically.



E.g. 34 + 27
Children will move the 'ones' cubes down to the bottom of the grid, followed by the 'tens' rods to find their total.

This leads on to the commonly recognised vertical method, where children add the units first before the tens.

$$\begin{array}{r} 3\,4 \\ +\ 2\,7 \\ \hline 6\,1 \\ {\scriptstyle 1} \end{array}$$

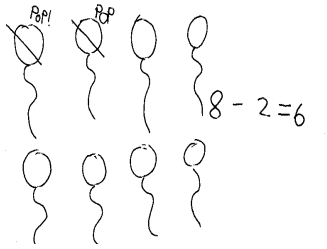
Once understanding is secure, children will add larger numbers, working with numbers of more than 4 digits by the time they reach Year 5. They will also add decimal numbers in different contexts such as money, or measures.
E.g. £2.57 + £8.66

$$\begin{array}{r} 2.57 \\ 8.66 \\ \hline 11.23 \\ \hline {\scriptstyle 1}\quad {\scriptstyle 1} \end{array}$$

SUBTRACTION

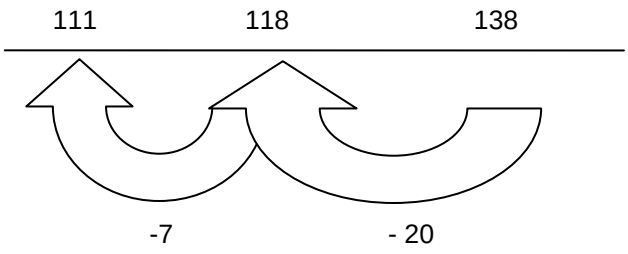
As with addition, children will be doing a daily mixture of practical, mental and oral work including lots of counting, talking about numbers and using numbers in real life activities. They will begin to record what they have done with pictures and numbers. This will help them to understand what is happening and how they have worked something out.

I have 8 balloons and two 'pop'. How many balloons are left?



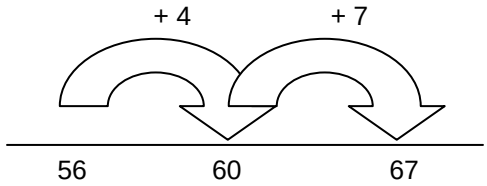
Children are shown two methods to subtract mentally, 'counting back' (take away) and 'counting up' (finding the difference). Depending upon the numbers involved one method can be more appropriate than the other. As with addition, the 'empty number line' can be used to help record their mental methods for subtraction.

Counting back (138 – 27)



SUBTRACTION

Counting up (67 – 56)



These steps can also be recorded vertically;

5 6 + 4 ⟶ 6 0
6 0 + 7 ⟶ 6 7

So the difference between 77 and 56 is 11 (4 + 7)

When ready, children in Year 2 will start to work more formally in columns, with practical equipment, as they have for addition. They will use balloons, straws and other mathematical equipment to carry out a formal written method, practically.

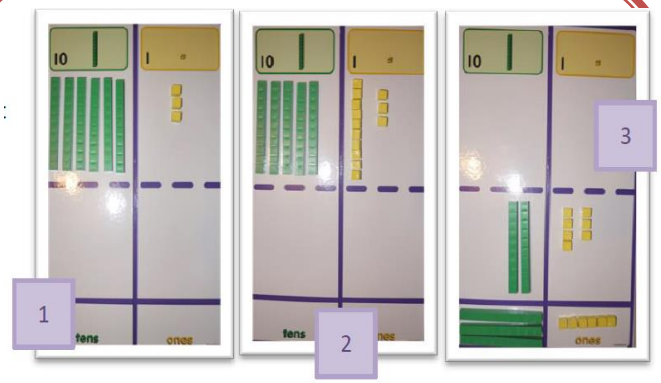
E.g. 28-5
Children will take away the 'ones' balloons and the 'tens' balloon packs, moving them down the grid, to see how much is left over.

This leads on to the commonly recognised vertical method, where children subtract the units first before the tens.

$$\begin{array}{r} 2\,8 \\ -\ \ 5 \\ \hline 2\,3 \end{array}$$

SUBTRACTION

Once they are secure with simple subtraction, they will be taught how to use the equipment for more difficult calculations. These will often require the children to 'exchange' a green 'ten rod' for ten yellow 'ones'



E.g. 63 - 27
Children will 'exchange' a gree ten rod for 10 yellow 'ones'. Now they can take away the 7 'ones' cubes and the 2 'tens' rods, moving them down the grid. They can see that 3 tens rods and 6 yellow 'ones' are left over.

This leads on to the commonly recognised vertical method, where children subtract the units first before the tens.

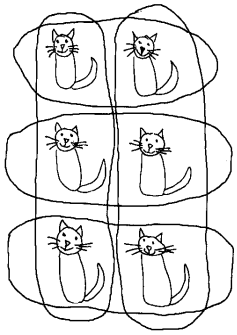
$$\begin{array}{r} {}^{5}\not{6}\,{}^{1}3 \\ -\ 2\ 7 \\ \hline 3\ 6 \end{array}$$

Children will start to subtract larger numbers, working with numbers with at least 4 digits by the end of Year 5. They will also subtract numbers in different contexts such as money and measures, involving the subtraction of decimals.
E.g. My total journey is 176.48 miles. I have already travelled 93.72 miles. How much of my journey is left?

$$\begin{array}{r} {}^{0}\not{1}\ {}^{1}7\ {}^{5}\not{6}\ .\ {}^{1}4\ 8 \\ 9\ 3\ .\ 7\ 2 \\ \hline 8\ 2\ .\ 7\ 6 \end{array}$$

MULTIPLICATION

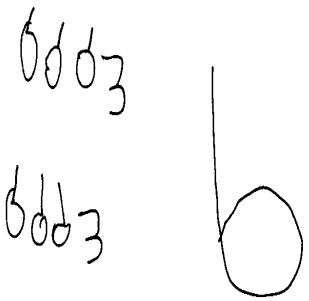
Children will first experience multiplication as the repeated addition of different groups of objects. E.g. counting pairs of socks on a line, or finding out the number of bread slices required when making sandwiches.



Children's early representations of 2 x 3…

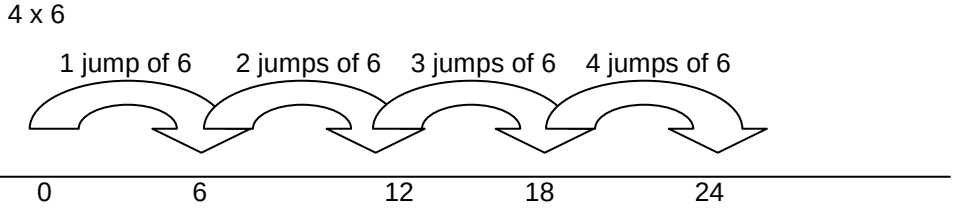
2 lots of 3 cats,
or 3 lots of 2 cats

2 groups of 3 apples



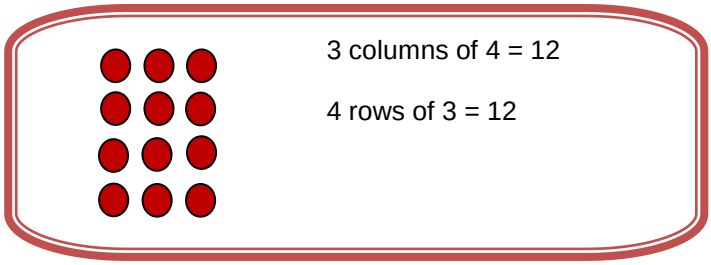
Your children will be encouraged to learn their multiplication tables, and given strategies to help them succeed. It is important that children learn the multiplication tables in a way that suits them. Some may find it easier to learn by chanting or using a CD. Others may find it easier to use songs and rhymes. Whichever way a child chooses, it is important that your child eventually knows the times tables up to and including 12 times. It is unlikely they will learn their multiplication tables in strict numerical order. Your child's class teacher will be able to indicate which multiplication tables he/she is currently learning.

Children will learn that multiplication is counting on in repeated steps, and may use the number track or number line to support them.



MULTIPLICATION

'Arrays' are used throughout the school to support children in being able to 'see' the multiplication. An array is an arrangement of rows and columns.



These arrays are then used to help children understand the 'grid method'. Here numbers are split or 'partitioned' before being multiplied together.

24 x 6

	20	4
6	120	24

= 144

35 x 42

	30	5	
40	1200	200	
2	60	10	= 1470

By the time your child reaches Year 4 their understanding of multiplication will be more secure, and they will be moved on to a vertical format, before refining even further.

24 x 16

```
  24
X 16
  24   (4 X 6)
 120   (20 X 6)
  40   (10 X 4)
 200   (10 X 20)
 384
```

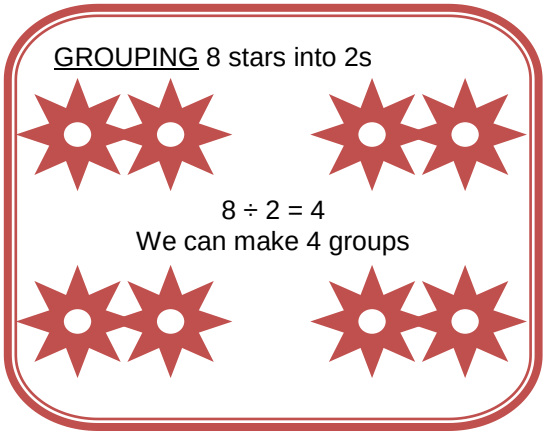
→

```
  24
X 16
 144   (24 X 6)
 240   (24 X 10)
 384
```

By the end of Year 4, children should be able to recall all of their multiplication tables up to 12 x 12, and understand related division facts, e.g. If I know 6x7=42, then I know 42÷6=7

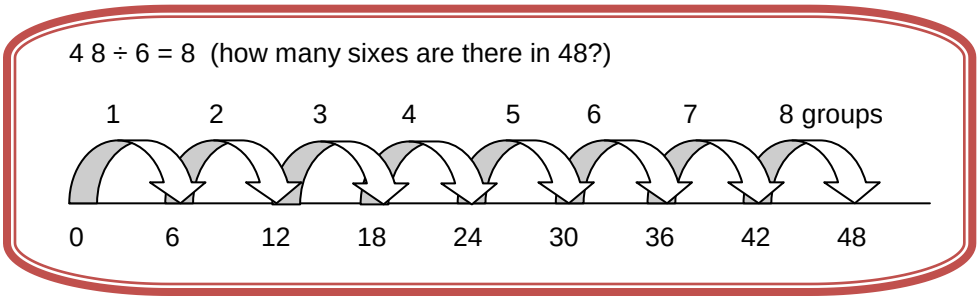
DIVISION

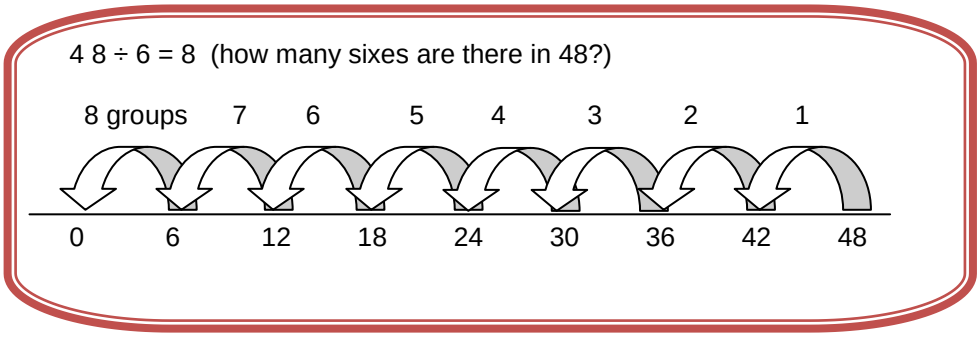
Children are taught to understand division as both ‘Sharing’ and ‘Grouping’



From a young age they are encouraged to draw pictures or make marks on the page to support their thinking. They will talk about sharing items between a given number, i.e. sharing 12 sweets between 3 people. Grouping can also be shown practically, e.g. finding how many 4-wheeled cars that can be made from 12 wheels (grouping into 4s)

The number line is used to model division and help children when counting in repeated steps, either forwards or backwards.

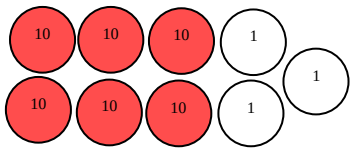




DIVISION

Once the children move into Year 3, they will be taught the more formal ‘short division’ method. This is supported in the classroom by the use of lots of practical equipment. It is important to ask your child HOW they have been taught, and ask them to show you.

63 ÷ 3



If the red ‘ten’ counters are shared between 3 people, they would each receive 2 of them (2 tens = 20). When the white ‘one’ counters are shared, each person would receive 1 of them (=1). They would each have 21 in total.

```
    2   1
  ------
3 | 6   3
```

This ‘short division’ method is used for all division calculations when dividing by a single digit number.
In Year 6 the children will be expected to divide by 2-digit numbers. For this they will use the ‘long division’ method using their knowledge of multiplication tables.

420 ÷ 15

```
    4   2   0
-   3   0   0    15 x 20
    -------
    1   2   0
-       7   5    15 x  5
    -------
        4   5
-       4   5    15 x  3
    -------
            0
```

Altogether, 28 groups of 15 could be taken away from 420.

```
15  x   1  =   15
15  x   2  =   30
15  x  10  =  150
15  x  20  =  300
15  x   5  =   75
```

Children are encouraged to write down the multiplication facts that can help them

FRACTIONS, GEOMETRY(SHAPE), MEASURES AND STATISTICS (HANDLING DATA)

Fractions

As soon as your child starts at Fordbridge Community Primary School, they will begin to explore fractions in everyday life. Initially they will be recognising, finding and naming half and quarter of objects, shapes or quantities. This will be extended to other fractions and children will explore the concept of equivalence.

Once children reach Key Stage 2, they will begin to order, compare, add and subtract fractions with the support of practical equipment. Decimal numbers will be introduced in contexts such as money and measures once the children are ready. At the end of Key Stage 2, your child will explore multiplying and dividing fractions in preparation for Key Stage 3.

Geometry (shape)

Many children are familiar with a variety of shapes when they first enter school, and this will be built upon in the classroom setting. Children will quickly learn to recognise and name common 2D and 3D shapes and relate these to everyday objects.

In Key Stage 2, children will explore different lines and angles using mathematical language. They will also begin to describe positions on a coordinate grid.

Measures

When measuring length, mass, capacity or time children will begin by using non-standard units e.g. measuring the length of the classroom in steps. They will soon begin to measure and record using standard, everyday measures e.g. cm/m, g/kg, ml/l, seconds/minutes. They learn to tell the time to the hour and half past the hour before moving onto 5 minute intervals.

Once children reach Key Stage 2, children will begin to explore and calculate perimeter, area and volume.

Statistics (Handling data)

Young children naturally enjoy sorting everyday objects according to colour, size and shape and answering simple questions. By the end of Key Stage 1, they will learn to record their findings using simple pictograms, tally charts and block diagrams.

These representations are further extended in Key Stage 2, to include bar charts, time graphs, line graphs and pie charts. Time tables and other charts will allow children to develop their skills in interpreting information.

Additional Mathematics for Year 6

The concepts of ratio and proportion are introduced at the very end of Key Stage 2. Children will solve problems and link back to previous work involving percentages.

Formal algebra will be taught in Year 6 when children will use simple formulae to generate and describe number sequences and solve problems.

HELPING AT HOME

Many parents and carers are already doing lots of mathematics at home with their children – often without realising it!

Here are some tips to get you started…

- It is most important that you *talk & listen* to your child about their work in maths. It will help your child if they have to explain to you. Remember, you are not expected to teach them new things.
- Share the maths activity with your child and discuss it with them.
- Be positive about maths, even if you don't feel confident about it yourself.
- If your child cannot do their homework, let their teacher know.
- A lot of maths can be done using everyday situations. Play games and have fun!

COUNTING IDEAS

- Look for numbers when you are out together. Read house numbers and those on buses.
- Practise chanting the number names and encourage your child to join in with you. Start from different numbers, and try counting backwards as well as forwards
- Sing number rhymes together
- Count different objects; coins, pasta, shapes, buttons etc.
- Count things you cannot touch or see such as jumps or claps
- Play games that involve counting and rolling dice
- Cut numerals from newspapers and magazines and encourage your child to place them in order. Can they read and order very large numbers such as house prices?
- Count up and back in steps that are smaller than one, e.g. 0, ¼, ½, ¾, 1, 1 ¼…

SHOPPING

- Writing and sorting shopping lists
- Look at prices of items
- Decide which coins to use, and calculate change
- Use a holiday brochure to find the price of a holiday
- Weight fruits and vegetables in the supermarket. Which are best value for money?
- Talk about the capacity, weight and shape of different bottles and containers
- Calculate the VAT on different amounts
- Work out the value of your money in different currencies using exchange rates
- Work out discounts in a sale, e.g. 20% off or half price
- Work out the cost of a meal, using prices on a menu
- Find the cost for the family to go on a trip to the cinema, bowling, swimming baths etc.

TIME

- Talk about different types of clocks; digital and analogue, those with missing numbers, roman numerals etc.
- Ask your child to tell you the time at different intervals – how long until lunch etc.
- Find out how long a journey will take, looking at timetables
- Work out the length of TV programmes, using the TV guide
- Estimate how long it will take to walk to school, write your name, make a sandwich…
- Find out about time differences in foreign countries. What time is it in Australia now?
- Put family members in order, according to age. Calculate how old they are, from the year in which they were born
- Talk about events during the day; breakfast time, dinner time, playtime, bath time etc. and put them in order.
- Talk about the months of the year. In which season does your birthday fall?

MEASURING

- Measure the heights of everyone in the family. Who is the shortest? Tallest?
- Weigh ingredients when baking
- Play with plastic jugs and containers in the bath. Which holds the most water? How many cups can you fill from the large bottle?
- Use the scale on a map to find the distance of a journey
- Measure a distance using hand spans or foot lengths
- Working out the area of a surface; e.g. how many tiles on the patio, how many tiles in the shower?
- Look at road signs, talk about the distances, speeds, heights of bridges etc.
- Work out the capacity of different containers; drinks cans, milk containers etc.
- Talk about the temperature of the oven when cooking
- Weight different toys to find the heaviest, two that weigh the same etc.
- How many cups of drink can you pour from a bottle? Estimate first.
- Wrapping birthday presents. How much paper will we need?

SHAPE

- Choose a shape, e.g. cylinder, and look for it in the environment. Can your child describe it?
- Play ‘guess my shape’. You think of a shape and your child asks questions to try to find out which shape you have chosen.
- Make a model using old boxes and containers. Describe the model in terms of the shapes used, how many corners etc.
- Look for symmetrical patterns or objects. Try to draw a symmetrical picture – a butterfly works well!
- What shapes can you see on local buildings? What shape are the windows?

PLAYING GAMES

Games are a wonderful way of practising a whole range of maths skills – whilst still having fun!

- Hop Scotch
- Ludo
- Snakes & Ladders
- Dominoes
- Bingo
- Dice Games
- Darts
- Chess
- Dot-to-Dot
- Counting in 2s or 5s whilst skipping
- Snooker
- Pool
- Snap
- Connect 4
- Number jigsaws
- Monopoly
- Draughts
- Happy Families
- Number puzzles

There are many useful resources and games available on the internet. Some of the websites we suggest are;

www.woodlands-junior.kent.sch.uk/maths
www.bbc.co.uk/bitesize/ks1/maths (for years 1 and 2)
www.bbc.co.uk/bitesize/ks2/maths (for years 3-6)
www.ictgames.com/resources.html
www.primarygamesarena.com

MATHEMATICAL VOCABULARY
Foundation Key Stage & Key Stage 1

number names, count up/on/back, more/less than, many, few, larger, greater, smaller, compare, order, first, second, third etc., before, after, between, odd, even, estimate, roughly, ones, units, tens, hundreds, thousands, greater/less than, exchange, sequence

add, sum, plus, total, altogether, take away, subtract, difference between, minus, equals, double, half, share, group, array, multiply, divide, times, row/column

symmetrical, pattern, flat, curved, round, hollow, solid, face, corner, edge, side, vertex/vertices, triangle, square, rectangle, circle, sphere, cone, cube, cuboid, pyramid, cylinder, quadrilateral, polygon, prism, position, clockwise, anti-clockwise

days of the week, fortnight, months of the year, seasons of the year, times of the day, wide, narrow, deep shallow, thick, thin, high, low, quick, slow, old, new, long, short, heavy, light, balance, far, near, close, length, width, height, depth, names of coins and notes, spend, change, cost, price, hours, minutes, seconds, words related to telling the time, digital, analogue, degrees, temperature, thermometer, centimetres, metres, grams, kilograms, millilitres, litres

tally chart, table, pictogram, label, title, block diagram, most/least popular, most/least common

MATHEMATICAL VOCABULARY
Key Stage 2

Children in Key Stage 2 will continue to use and apply the vocabulary listed above for the Foundation Stage and Key Stage 1, whilst learning the new vocabulary listed below.

multiple, partition, numeral, round up/down, round to the nearest…, approximate, negative, positive, integer, factor, square number, prime number, prime factor, multiple, factorise, consecutive, ten thousand, hundred thousand, million,

inverse, column/ vertical layout, increase/decrease, brackets, , multiplication, division, product, remainder, scale/scaling, quotient, squared, cubed, brackets

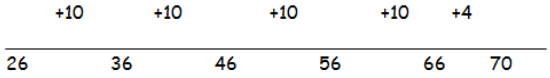
numerator, denominator, decimal point, equivalent fraction, unit fraction, tenth, hundredth, thousandth, percentage, mixed number, proper fraction, recurring decimal

semi-circle, pentagon, hexagon, oblong, hemisphere, tetrahedron, horizontal, vertical, diagonal, turn, parallel, right-angle, acute, obtuse, reflex, clockwise/anti-clockwise, compass points, concave, convex, scalene, equilateral, isosceles, coordinate, quadrant, translation, reflection, protractor, x-axis, y-axis, plane

distance, apart, distance to/from, kilometre, millimetre, perimeter, area, depth, breadth, a.m./p.m., arrive, depart, leap year, century, millennium, calendar, date, value/worth, mass, metric, imperial, inches, pounds, pints, gallons, currency, discount, miles, yard, feet/inches, cubic measures, circumference, radius, diameter

bar chart, axis, scale, survey, questionnaire, discrete, continuous, data, time graph, Carroll diagram, Venn diagram, plot, line graph, database, bar line chart, pie chart, mean, average

MATHEMATICAL GLOSSARY OF TERMS

Partition	To split a number into smaller components E.g. 235 = 200 + 30 + 5 Or 7 = 5 + 2 = 4 + 3 and so on
Number sentence	Written horizontal calculation E.g. 45 + 34 = 45 + 30 = 75 + 4 = 79 Or 56 + 23 = 79 I won 5 marbles and then I won 3 more. I have 8 marbles
Empty number line	A hand drawn line used to assist with a mental calculation. E.g. 
Jottings	Any method of recording numbers / strategies that is not formalised. E.g. use of empty number lines, number sentences.
Vertical standard method	Any written method set out in a vertical format. E.g. 46 + 27 leading to 376 + 148 = 524 6+7 = 13 40+20 = 60 73 1 1
Expanded Method	A written method that acts as a 'stepping stone' between a mental method with jottings and a standard written method. E.g. 274 + 123 200 70 4 100 20 3 300 90 7

MATHEMATICAL GLOSSARY OF TERMS

<table>
<tr>
<td>Grid Method</td>
<td>Informal multiplication written method involving the partitioning of numbers within a grid structure.
E.g. 34 x 27

<table>
<tr><td>X</td><td>20</td><td>7</td><td></td></tr>
<tr><td>30</td><td>600</td><td>210</td><td>810</td></tr>
<tr><td>4</td><td>80</td><td>28</td><td>108</td></tr>
<tr><td></td><td></td><td></td><td>918</td></tr>
</table>
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<tr>
<td>Sharing</td>
<td>A form of division where a number is shared equally into sets.
E.g. There are 12 cub scouts and 3 tents. How many cubs will there be in each tent?

12 ÷ 3 = 4

<table>
<tr><td></td><td>4</td></tr>
<tr><td>Tent 1</td><td>/ / / /</td></tr>
<tr><td>Tent 2</td><td>/ / / /</td></tr>
<tr><td>Tent 3</td><td>/ / / /</td></tr>
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<tr>
<td>Grouping</td>
<td>A form of division where a number is split into a number of groups
E.g. 42 children are visiting the sea life centre on minibuses. Each minibus holds 6 children. How many minibuses will be needed?

42 ÷ 6 = 7

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We would like to thank you for all of your help and support. Becoming more involved in the mathematics that your child is doing in school, and helping them practise at home, will really benefit them in the future.

If you have any questions relating to your child's maths learning, please speak to their class teacher.