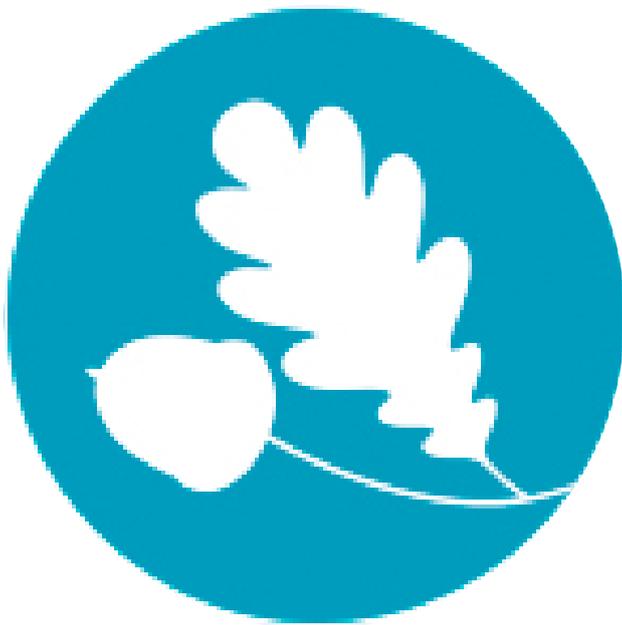


2017-2018

Merrylands Primary School & Nursery
Year 5 Maths Guide



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How to use this guide

This is a guide for parents, carers and staff at Merrylands Primary School and Nursery.

The purpose of this document is to allow everyone to see the different methods, models and images that are used to teach addition, subtraction, multiplication and division. This will allow parents and carers to help their children at home and will also ensure consistency in teaching at school.

Maths at Merrylands uses the principles of **‘Concrete, Pictorial, Abstract’ (CPA)**. Children start off using ‘Concrete’ resources, such as blocks and counters, which they can move and manipulate to represent calculations. They then move on to the ‘Pictorial’ stage where they may use or draw pictures to represent calculations. Finally, they move on to the ‘Abstract’ stage where they use numbers and symbols to show calculations.

Concrete methods and equipment will be used at some point in all year groups – using practical resources instead of abstract methods does not necessarily mean that a child is working below age-related expectations. Children may also use a variety of different methods to solve reasoning problems; again, this does not necessarily mean that they are working below the level expected for their age.

This guide is divided into three sections. The first section shows you the different objectives and methods that your child will encounter at school. In this section, each calculation type has been colour coded.

Addition methods are **orange**

Subtraction methods are **blue**

Multiplication methods are **green**

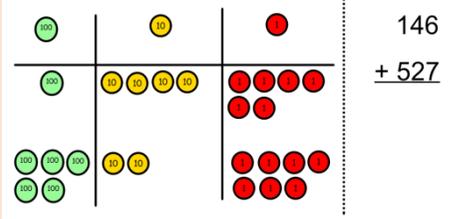
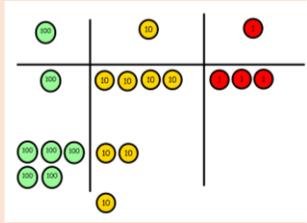
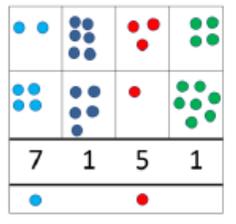
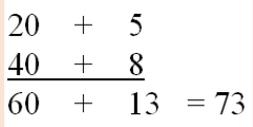
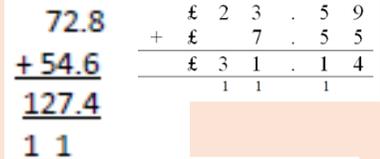
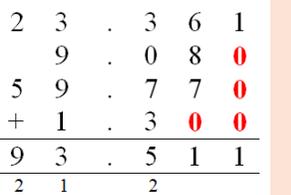
Division methods are **yellow**

Each method shows you the concrete, pictorial and abstract ways to use each method. Different problems may require different methods – if your child finds a question difficult, see if they can use a different method to solve the problem.

In the second section, you will find the National Curriculum objectives and the ‘Big Ideas’ for each year group. The Big Ideas are the key concepts that children need to understand in order to progress successfully. The National Curriculum objectives are what children need to achieve to be working at age-related expectations at the end of each year.

In the third section, you will find the new mathematical vocabulary that your child will encounter this year; this will build on the new words introduced and used in previous years.

Year 5 Methods and Objectives

Objective and Strategies	Concrete	Pictorial	Abstract
<p>Column method-regrouping</p> <p>Year 5 – numbers with more than 4 digits AND decimal numbers with the same amount of decimal places</p>	<p>Make both numbers on a place value grid.</p>  <p>146 + 527</p> <p>Add up the units and exchange 10 ones for one 10.</p>  <p>Add up the rest of the columns, exchanging the 10 counters from one column for the next place value column until every column has been added.</p> <p>This can also be done with Base 10 to help children clearly see that 10 ones equal 1 ten and 10 tens equal 100.</p> <p>As children move on to decimals, money and decimal place value counters can be used to support learning.</p>	<p>Children can draw a pictorial representation of the columns and place value counters to further support their learning and understanding.</p> 	<p>Start by partitioning the numbers before moving on to clearly show the exchange below the addition.</p>  <p>As the children move on, introduce decimals with the same number of decimal places and different. Money can be used here.</p>  

Column method with regrouping

Year 5 – numbers with more than 4 digits AND decimal numbers with the same number of places

Use Base 10 to start with before moving on to place value counters. Start with one exchange before moving onto subtractions with 2 exchanges.

Make the larger number with the place value counters Start with the ones, can I take away 8 from 4 easily? I need to exchange one of my tens for ten ones.

100	10	1
100 100	10 10 10	1 1 1 1

Calculations

$$\begin{array}{r} 234 \\ - 88 \\ \hline \end{array}$$

100	10	1
100 100	10 10	1 1 1 1 1 1 1 1 1 1 1 1

Calculations

$$\begin{array}{r} 234 \\ - 88 \\ \hline \end{array}$$

Now I can subtract my ones.

100	10	1
100 100	10 10	1 1 1 1 1 1 1 1 1 1 1 1

Calculations

$$\begin{array}{r} 234 \\ - 88 \\ \hline \end{array}$$

Now look at the tens, can I take away 8 tens easily? I need to exchange one hundred for ten tens.

100	10	1
100	10 10 10 10 10 10 10 10 10 10	1 1 1 1 1 1

Calculations

$$\begin{array}{r} 234 \\ - 88 \\ \hline \end{array}$$

Now I can take away eight tens and complete my subtraction

100	10	1
100	10 10	1 1 1 1 1 1

Calculations

$$\begin{array}{r} 234 \\ - 88 \\ \hline 146 \end{array}$$

Show children how the concrete method links to the written method alongside your working. Cross out the numbers when exchanging and show where we write our new amount.

Hundreds	Tens	Ones
5	12	6
- 2	7	5
3	5	1

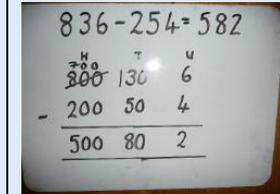
Draw the counters onto a place value

grid and show what you have taken away by crossing the counters out as well as clearly showing the exchanges you make.

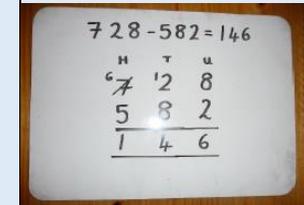


When confident, children can find their own way to record the exchange/regrouping.

Just writing the numbers as shown here shows that the child understands the method and knows when to exchange/regroup.



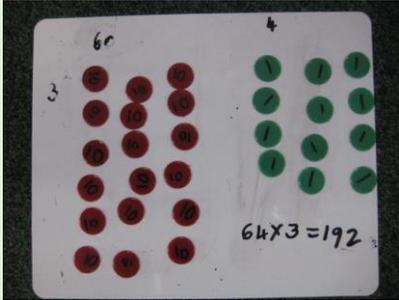
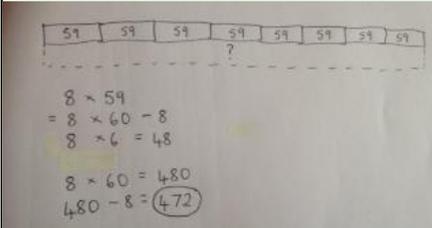
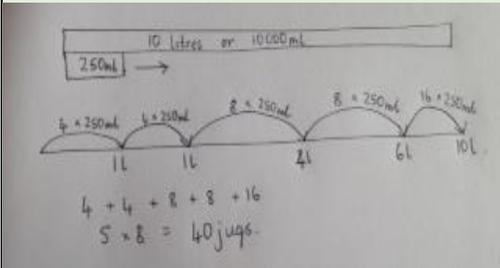
Children can start their formal written method by partitioning the number into clear place value columns.

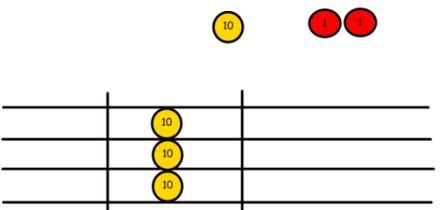
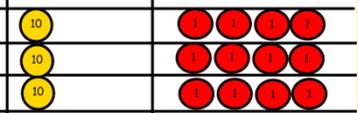
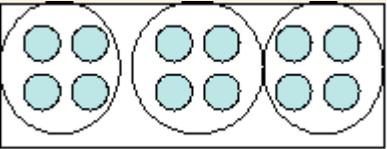


Moving forward the children use a more compact method.

$$\begin{array}{r} 5 \quad 12 \quad 1 \\ 2 \quad \cancel{6} \quad \cancel{3} \quad . \quad 0 \\ - \quad 2 \quad 6 \quad . \quad 5 \\ \hline 2 \quad 3 \quad 6 \quad . \quad 5 \end{array}$$

This will lead to an understanding of subtracting any number including decimals.

Objective and Strategies	Concrete	Pictorial	Abstract
<p>Column multiplication</p> <p>Year 5 – up to 4 digit numbers multiplied by 1 or 2 digit numbers</p>	<p>Children can continue to be supported by place value counters at the stage of multiplication.</p>  <p>It is important at this stage that they always multiply the ones first and note down their answer followed by the tens which they note below.</p>	<p>Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods.</p>  	<p>Start with long multiplication, reminding the children about lining up their numbers clearly in columns.</p> <p>If it helps, children can write out what they are solving next to their answer.</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: right;"> $\begin{array}{r} 32 \\ \times 24 \\ \hline 8 \\ 120 \\ 40 \\ \hline 600 \\ 768 \end{array}$ <p>(4 x 2) (4 x 30) (20 x 2) (20 x 30)</p> </div> <div style="text-align: right;"> $\begin{array}{r} 74 \\ \times 63 \\ \hline 12 \\ 210 \\ \hline 240 \\ 4200 \\ \hline 4662 \end{array}$ </div> </div> <p>This moves to the more compact method.</p> <div style="text-align: right;"> $\begin{array}{r} 1342 \\ \times 18 \\ \hline 13420 \\ 10736 \\ \hline 24156 \\ 1 \end{array}$ </div>

Objective and Strategies	Concrete	Pictorial	Abstract									
<p>Short division</p> <p>Year 5 – up to 4 digits divided by a 1 digit number and interpret remainders in context</p>	<p style="text-align: center;">Tens Units</p> <p style="text-align: center;">3 2</p> <div style="display: flex; align-items: center;"> <div style="margin-right: 20px;">3</div>  </div> <p>Use place value counters to divide using the bus stop method alongside</p> <p>$42 \div 3 =$</p> <div style="display: flex; align-items: center;">  <div style="margin-left: 20px;"> <p>Calculations</p> <p>$42 \div 3$</p> <table border="1" style="width: 100px; height: 50px; border-collapse: collapse;"> <tr><td style="width: 30px; height: 20px;"></td><td style="width: 30px; height: 20px;"></td><td style="width: 30px; height: 20px;"></td></tr> <tr><td style="width: 30px; height: 20px;"></td><td style="width: 30px; height: 20px;"></td><td style="width: 30px; height: 20px;"></td></tr> <tr><td style="width: 30px; height: 20px;"></td><td style="width: 30px; height: 20px;"></td><td style="width: 30px; height: 20px;"></td></tr> </table> </div> </div> <p>Start with the biggest place value, we are sharing 40 into three groups. We can put 1 ten in each group and we have 1 ten left over.</p> <div style="display: flex; align-items: center;">  <div style="margin-left: 20px;"> <p>We exchange this ten for ten ones and then share the ones equally among the groups.</p> </div> </div> <p>We look how much in 1 group so the answer is 14.</p> 										<p>Students can continue to use drawn diagrams with dots or circles to help them divide numbers into equal groups.</p>  <p>Encourage them to move towards counting in multiples to divide more efficiently.</p>	<p>Begin with divisions that divide equally with no remainder.</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> $\begin{array}{r} 218 \\ 3 \overline{) 872} \end{array}$ </div> <p>Move onto divisions with a remainder.</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> $\begin{array}{r} 86 \text{ r } 2 \\ 3 \overline{) 432} \end{array}$ </div> <p>Finally move into decimal places to divide the total accurately.</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> $\begin{array}{r} 14.6 \\ 35 \overline{) 511.0} \end{array}$ </div>

Year 5 Curriculum Expectations and Big Ideas

End of Year 5 Expectations	Big Ideas
<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> • read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit • interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers including through zero • add and subtract whole numbers with more than four digits, including using formal written methods (columnar addition and subtraction) • add and subtract numbers mentally with increasingly large numbers (e.g. $12\ 462 - 2300 = 10\ 162$) • solve problems involving numbers up to three decimal places • identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers • multiply numbers up to four digits by a 1 or 2-digit number using a formal written method, including long multiplication for 2-digit numbers • multiply and divide numbers mentally drawing upon known facts • divide numbers up to four digits by a 1-digit number using the formal written method of short division and interpret remainders appropriately for the context • multiply and divide whole numbers and those involving decimals by 10, 100 and 1000 • recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3) • solve problems involving multiplication and division, including using their knowledge of factors and multiples, squares and cubes • solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign 	<ul style="list-style-type: none"> • Large numbers of six digits are named in a pattern of three: hundreds of thousands, tens of thousands, ones of thousands, mirroring hundreds, tens and ones. • It is helpful to relate large numbers to real-world contexts, for example the number of people that a local sports arena can hold. • Before starting any calculation is it helpful to think about whether or not you are confident that you can do it mentally. For example, $3689 + 4998$ may be done mentally, but $3689 + 4756$ may require paper and pencil. • Carrying out an equivalent calculation might be easier than carrying out the given calculation. For example $3682 - 2996$ is equivalent to $3686 - 3000$ (constant difference). • Pupils have a firm understanding of what multiplication and division mean and have a range of strategies for dealing with large numbers, including both mental and standard written methods. They see the idea of factors, multiples and prime numbers as connected and not separate ideas to learn. • They recognise how to use their skills of multiplying and dividing in new problem solving situations. • Fractions and division are connected ideas: $36 \div 18 = 36/18 = 2$; $18/36 = 1/2$. • Factors and multiples are connected ideas: 48 is a multiple of 6 and 6 is a factor of 48.

New Vocabulary for Year 5

Number and place value	Addition and subtraction	Multiplication and division	Fractions, decimals and percentages
Powers of 10	Efficient written method	Factor pairs Composite numbers, prime number, prime factors, square number, cubed number Formal written method	Proper fractions, improper fractions, mixed numbers Percentage Half, quarter, fifth, two fifths, four fifths Ratio, proportion