

Maths at Brereton

How do we teach Maths at Brereton?

At Brereton, we use Power Maths as a basis of our maths lesson. This is an exciting class mastery approach, which has been recommended by the DfE, that works for every child. It is based upon the concrete, pictorial and abstract approach.

Every lesson is divided into sections that involve plenty of discovery, sharing, collaboration, practice and reflection. Children are encouraged to solve problems each day through the use of concrete resources, pictorial representations and abstract thinking.

At the heart of this programme is the idea that all children can achieve and be successful mathematicians with the right growth mindset.



What does a Power Maths

Power Up

Place digit cards in a 4 x 4 grid to make different 4-digit numbers.

Tell your partner all of the 4-digit numbers that you have made. Read out all the rows, the columns and the diagonals.

Use the numbers you have made to answer these questions:

- Which number is closest to 1,000?
- Which number is larger than 5,000?
- Which number is the smallest odd number?
- Which number is closest to 2,500?
- Which number is closest to 10,000?

I have more than one number that is larger than 5,000.

Power Up: Each lesson begins with a Power Up task. This is often something the children have been previously taught and encourages group or partner work. This involves lots of discussion to get children thinking mathematically.

Discover: This part of the lesson introduces the learning objective to the class. The children are presented with a problem they must try to solve using problem solving and reasoning.

Adding two 4-digit numbers 3

Discover

Sports car £4,799
Motorbike £1,095
Van £1,905
Vintage car £775

Share: This is an opportunity to look at how the class have decided to tackle the Discover problem. As a class, we will look at different methods that have been used before looking at the most efficient method. At this point, it is encouraged to have learning aids out. This might include place value counters or Base 10. This is so that children can understand the concept behind the teaching.

Share

a) This addition has more than one exchange.

Th	H	T	O	Th	H	T	O
4	7	9	9	4	7	9	9
+	1	0	9	5	8	4	4
				+	1	0	9
				5	8	4	4

4,799 + 1,095 = 5,894
The total value of the sports car and the motorbike is £5,894.

Think together: This part of the lesson allows children to practice the methods they have been shown during the Share part of the lesson. It follows a structure of I do, We do, You do. The teacher models the method before the children try the method with a partner and on their own.

Think together

1 How much do the van and the vintage car cost in total?

Th	H	T	O	Th	H	T	O
1	9	0	5	1	9	0	5
+				+			
				1	9	0	5

1,905 + =
The van and the vintage car cost £ in total.

I need to think carefully about how to write the addition in columns.

2 The caravan costs £1,775 more than the motorbike. How much does the caravan cost?

Th	H	T	O	Th	H	T	O
1	7	7	5	1	7	7	5
+				+			
				1	7	7	5

The caravan costs £ .

Adding two 4-digit numbers 3

1 Complete these additions.

Th	H	T	O	Th	H	T	O
1	6	3	5	1	6	3	5
+	2	1	8	6	2	1	8
				+	2	1	8
				3	8	4	4

Independent work: The main part of the lesson consists of independent practice. The questions in the Power Maths workbook allow children the opportunity to work through problems related to the learning objective that become progressively harder.

2 a) Choose pairs of numbers so that each addition has two exchanges. Then solve each of your calculations.

3,405	1,726	Th	H	T	O	Th	H	T	O
+		+		+		+		+	
1,283	894	Th	H	T	O	Th	H	T	O
+		+		+		+		+	

b) Now think of your own numbers to make up two more additions, each with two exchanges.

Th	H	T	O	Th	H	T	O
+		+		+		+	

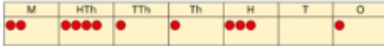
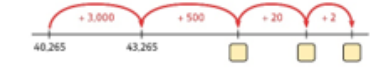
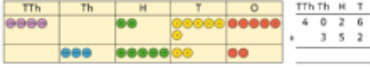
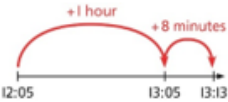
Reflect: Each lesson ends with a reflection. This is an opportunity for children to explain what they have learnt during the lesson.


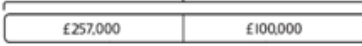
Reflect



When I add 4-digit numbers, I need to remember to:

- 1.
- 2.
- 3.

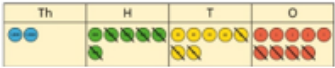
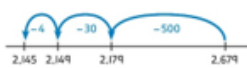
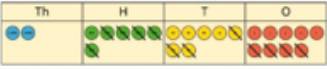
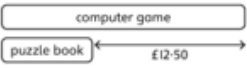
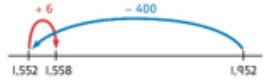
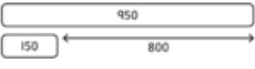
Addition

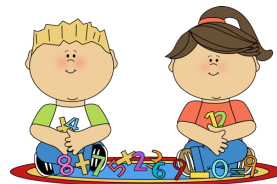
<p>Comparing and selecting efficient methods</p>	<p>Represent 7-digit numbers on a place value <u>grid</u> and use this to support thinking and mental methods.</p> 	<p>Discuss similarities and differences between methods, and choose efficient methods based on the specific calculation. Compare written and mental methods alongside place value representations.</p>   <p>Use bar model and number line representations to model addition in problem-solving and measure contexts.</p> 	<p>Use column addition where mental methods are not efficient. Recognise common errors with column addition.</p> $32,145 + 4,302 = ?$ <table border="0" style="display: inline-table; margin-right: 20px;"> <tr><td>TTh</td><td>Th</td><td>H</td><td>T</td><td>O</td></tr> <tr><td>3</td><td>2</td><td>1</td><td>4</td><td>5</td></tr> <tr><td>+</td><td>4</td><td>3</td><td>0</td><td>2</td></tr> <tr><td colspan="5"><hr/></td></tr> <tr><td>3</td><td>6</td><td>4</td><td>4</td><td>7</td></tr> </table> <table border="0" style="display: inline-table;"> <tr><td>TTh</td><td>Th</td><td>H</td><td>T</td><td>O</td></tr> <tr><td>3</td><td>2</td><td>1</td><td>4</td><td>5</td></tr> <tr><td>+</td><td>4</td><td>3</td><td>0</td><td>2</td></tr> <tr><td colspan="5"><hr/></td></tr> <tr><td>7</td><td>5</td><td>1</td><td>6</td><td>5</td></tr> </table> <p>Which method has been completed accurately?</p> <p>What mistake has been made?</p> <p>Column methods are also used for decimal additions where mental methods are not efficient.</p> <table border="0"> <tr><td>H</td><td>T</td><td>O</td><td>·</td><td>Tth</td><td>Hth</td></tr> <tr><td>1</td><td>4</td><td>0</td><td>·</td><td>0</td><td>9</td></tr> <tr><td>+</td><td>4</td><td>9</td><td>·</td><td>8</td><td>9</td></tr> <tr><td colspan="6"><hr/></td></tr> <tr><td>1</td><td>8</td><td>9</td><td>·</td><td>9</td><td>8</td></tr> </table>	TTh	Th	H	T	O	3	2	1	4	5	+	4	3	0	2	<hr/>					3	6	4	4	7	TTh	Th	H	T	O	3	2	1	4	5	+	4	3	0	2	<hr/>					7	5	1	6	5	H	T	O	·	Tth	Hth	1	4	0	·	0	9	+	4	9	·	8	9	<hr/>						1	8	9	·	9	8
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<p>Selecting mental methods for larger numbers where appropriate</p>	<p>Represent 7-digit numbers on a place value <u>grid</u> and use this to support thinking and mental methods.</p>  $2,411,301 + 500,000 = ?$ <p>This would be 5 more counters in the <u>HTh</u> place.</p> <p>So, the total is 2,911,301.</p> $2,411,301 + 500,000 = 2,911,301$	<p>Use a bar model to support thinking in addition problems.</p> $257,000 + 99,000 = ?$  <p>I added 100 <u>thousands</u> then subtracted 1 thousand.</p> $257 \text{ thousands} + 100 \text{ thousands} = 357 \text{ thousands}$ $257,000 + 100,000 = 357,000$ $357,000 - 1,000 = 356,000$ <p>So, $257,000 + 99,000 = 356,000$</p>	<p>Use place value and unitising to support mental calculations with larger numbers.</p> $195,000 + 6,000 = ?$ $195 + 5 + 1 = 201$ <p>195 <u>thousands</u> + 6 <u>thousands</u> = 201 <u>thousands</u></p> <p>So, $195,000 + 6,000 = 201,000$</p>
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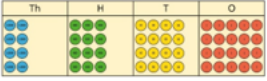
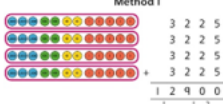
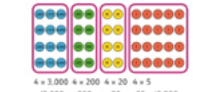
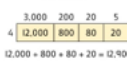

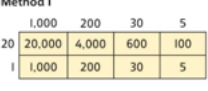
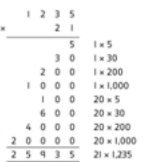

<p>Understanding order of operations in calculations</p>	<p>Use equipment to model different interpretations of a calculation with more than one operation. Explore different results.</p> $3 \times 5 - 2 = ?$  <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> $\begin{array}{l} 3 \times 5 - 2 \\ \downarrow \quad \downarrow \\ 3 \times 3 = 9 \end{array}$ </div> <div style="text-align: center;"> $\begin{array}{l} 3 \times 5 - 2 \\ \downarrow \quad \downarrow \\ 15 - 2 = 13 \end{array}$ </div> </div>	<p>Model calculations using a bar model to demonstrate the correct order of operations in multi-step calculations.</p>  <p>This can be written as:</p> $16 \times 4 + 16 \times 6$ $64 + 96 = 160$	<p>Understand the correct order of operations in calculations without brackets.</p> <p>Understand how brackets affect the order of operations in a calculation.</p> $4 + 6 \times 16$ $4 + 96 = 100$ $(4 + 6) \times 16$ $10 \times 16 = 160$
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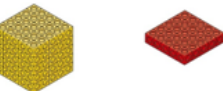
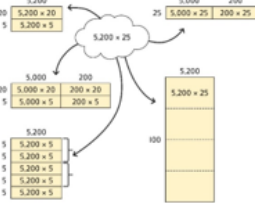
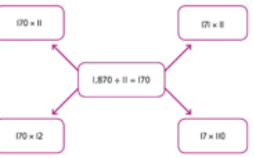
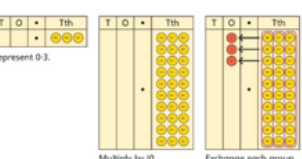
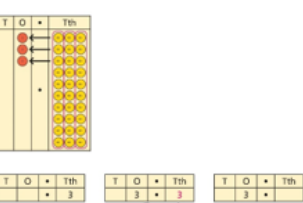
Subtraction

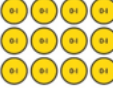

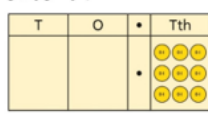
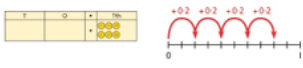
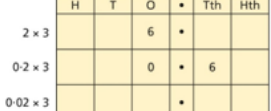
<p>Comparing and selecting efficient methods</p>	<p>Use counters on a place value grid to represent subtractions of larger numbers.</p> 	<p>Compare subtraction methods alongside place value representations.</p>   <table border="1" data-bbox="678 459 774 537"> <thead> <tr> <th>Th</th> <th>H</th> <th>T</th> <th>O</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>3</td> <td>4</td> <td>9</td> </tr> <tr> <td>-</td> <td>5</td> <td>3</td> <td>4</td> </tr> <tr> <td>2</td> <td>1</td> <td>4</td> <td>5</td> </tr> </tbody> </table> <p>Use a bar model to represent calculations, including 'find the difference' with two bars as comparison.</p> 	Th	H	T	O	2	3	4	9	-	5	3	4	2	1	4	5	<p>Compare and select methods. Use column subtraction when mental methods are not efficient. Use two different methods for one calculation as a checking strategy.</p> <table border="1" data-bbox="1085 380 1197 459"> <thead> <tr> <th>Th</th> <th>H</th> <th>T</th> <th>O</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>5</td> <td>5</td> <td>8</td> </tr> <tr> <td>-</td> <td>3</td> <td>9</td> <td>4</td> </tr> </tbody> </table>  <p>Use column subtraction for decimal problems, including in the context of measure.</p> <table border="1" data-bbox="1085 571 1252 660"> <thead> <tr> <th>H</th> <th>T</th> <th>O</th> <th>Tth</th> <th>Hth</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>0</td> <td>9</td> <td>6</td> <td>0</td> </tr> <tr> <td>-</td> <td>2</td> <td>0</td> <td>6</td> <td>4</td> </tr> <tr> <td>1</td> <td>0</td> <td>3</td> <td>2</td> <td>0</td> </tr> </tbody> </table>	Th	H	T	O	1	5	5	8	-	3	9	4	H	T	O	Tth	Hth	3	0	9	6	0	-	2	0	6	4	1	0	3	2	0
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<p>Subtracting mentally with larger numbers</p>		<p>Use a bar model to show how unitising can support mental calculations.</p> <p>$950,000 - 150,000$ That is <u>950 thousands</u> - 150 thousands</p>  <p>So, the difference is <u>800 thousands</u>. $950,000 - 150,000 = 800,000$</p>	<p>Subtract efficiently from powers of 10.</p> <p>$10,000 - 500 = ?$</p>																																																



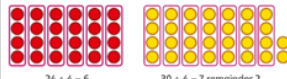
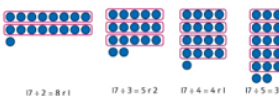

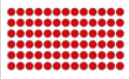
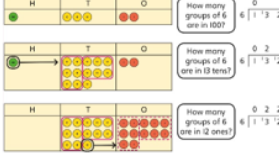

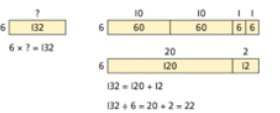
Multiplication


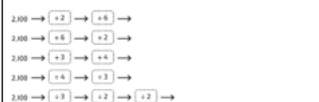

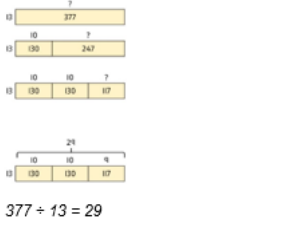
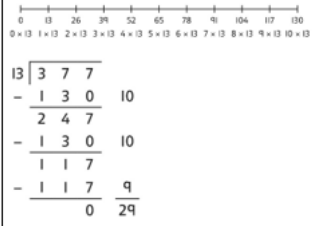
<p>Multiplying up to a 4-digit number by a single digit number</p>	<p>Use equipment to explore multiplications.</p>  <p>4 groups of 2,345</p> <p>This is a multiplication:</p> $4 \times 2,345$ $2,345 \times 4$	<p>Use place value equipment to compare methods.</p> <p>Method 1</p>  <p>Method 2</p> 	<p>Understand area model and short multiplication.</p> <p>Compare and select appropriate methods for specific multiplications.</p> <p>Method 3</p>  <p>Method 4</p> 
<p>Multiplying up to a 4-digit number by a 2-digit number</p>	<p>Use an area model alongside written multiplication.</p> <p>Method 1</p>  	<p>Use compact column multiplication with understanding of place value at all stages.</p> 	

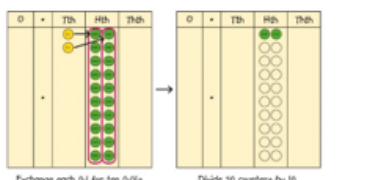



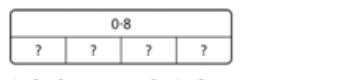

<p>Using knowledge of factors and partitions to compare methods for multiplications</p>	<p>Use equipment to understand square numbers and cube numbers.</p>  <p>$5 \times 5 = 5^2 = 25$ $5 \times 5 \times 5 = 5^3 = 25 \times 5 = 125$</p>	<p>Compare methods visually using an area model. Understand that multiple approaches will produce the same answer if completed accurately.</p>  <p>Represent and compare methods using a bar model.</p>	<p>Use a known fact to generate families of related facts.</p>  <p>Use factors to calculate efficiently.</p> $15 \times \frac{16}{5} = 3 \times 5 \times 2 \times 8 = 3 \times 8 \times 2 \times 5 = 24 \times 10 = 240$
<p>Multiplying by 10, 100 and 1,000</p>	<p>Use place value equipment to explore exchange in decimal multiplication.</p>  <p>0.3 x 10 = 3 0.3 is 3 tenths. 10 x 3 tenths are 30 tenths. 30 tenths are equivalent to 3 ones.</p>	<p>Understand how the exchange affects decimal numbers on a place value grid.</p>  <p>0.3 x 10 = 3</p>	<p>Use knowledge of multiplying by 10, 100 and 1,000 to multiply by multiples of 10, 100 and 1,000.</p> $8 \times 100 = 800$ $8 \times 300 = 800 \times 3 = 2,400$ $2.5 \times 10 = 25$ $2.5 \times 20 = 2.5 \times 10 \times 2 = 50$

<p>Multiplying decimals</p> <p>Explore decimal multiplications using place value equipment and in the context of measures.</p>  <p>3 groups of 4 tenths is 12 tenths. 4 groups of 3 tenths is 12 tenths.</p>  <p>$4 \times 1 \text{ cm} = 4 \text{ cm}$ $4 \times 0.3 \text{ cm} = 1.2 \text{ cm}$ $4 \times 1.3 = 4 + 1.2 = 5.2 \text{ cm}$</p>	<p>Represent calculations on a place value grid.</p> $3 \times 3 = 9$ $3 \times 0.3 = 0.9$  <p>Understand the link between multiplying decimals and repeated addition.</p> 	<p>Use known facts to multiply decimals.</p> $4 \times 3 = 12$ $4 \times 0.3 = 1.2$ $4 \times 0.03 = 0.12$ $20 \times 5 = 100$ $20 \times 0.5 = 10$ $20 \times 0.05 = 1$ <p>Find families of facts from a known multiplication.</p> <p>I know that $18 \times 4 = 72$.</p> <p>This can help me work out:</p> $1.8 \times 4 = 7.2$ $18 \times 0.4 = 7.2$ $180 \times 0.4 = 72$ $18 \times 0.04 = 0.72$ <p>Use a place value grid to understand the effects of multiplying decimals.</p> 
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Division

<p>Understanding factors</p>	<p>Use equipment to explore different factors of a number.</p>  <p>$24 \div 4 = 6$ $30 \div 4 = 7$ remainder 2</p> <p>4 is a factor of 24 but is not a factor of 30.</p>	<p>Recognise prime numbers as numbers having exactly two factors. Understand the link with division and remainders.</p>  <p>$17 \div 2 = 8 \text{ r } 1$ $17 \div 3 = 5 \text{ r } 2$ $17 \div 4 = 4 \text{ r } 1$ $17 \div 5 = 3 \text{ r } 2$</p>	<p>Recognise and know primes up to 100. Understand that 2 is the only even prime, and that 1 is not a prime number.</p> 
<p>Dividing by a single digit</p>	<p>Use equipment to make groups from a total.</p>  <p>There are 78 in total. There are 6 groups of 13. There are 13 groups of 6.</p>	 <p>How many groups of 6 are in 100? $6 \overline{) 132}$ How many groups of 6 are in 13 tens? $6 \overline{) 132}$ How many groups of 6 are in 2 ones? $6 \overline{) 132}$</p>	<p>Use short division to divide by a single digit.</p>  <p>Use an area model to link multiplication and division.</p>  <p>$6 \times 7 = 132$ $132 \div 6 = 20 + 2 = 22$</p>

<p>Dividing by a 2-digit number using factors</p>	<p>Understand that division by factors can be used when dividing by a number that is not prime.</p>	<p>Use factors and repeated division.</p> <p>$1,260 \div 14 = ?$</p>  <p>$1,260 \div 2 = 630$ $630 \div 7 = 90$ $1,260 \div 14 = 90$</p>	<p>Use factors and repeated division where appropriate.</p> <p>$2,100 \div 12 = ?$</p> 
<p>Dividing by a 2-digit number using long division</p>	<p>Use equipment to build numbers from groups.</p>  <p>182 divided into groups of 13. There are 14 groups.</p>	<p>Use an area model alongside written division to model the process.</p> <p>$377 \div 13 = ?$</p>  <p>$377 \div 13 = 29$</p>	<p>Use long division where factors are not useful (for example, when dividing by a 2-digit prime number). Write the required multiples to support the division process.</p> <p>$377 \div 13 = ?$</p>  <p>$377 \div 13 = 29$</p>

<p>Dividing by 10, 100 and 1,000</p>	<p>Use place value equipment to explore division as exchange.</p>  <p>Exchange each 0.1 for ten 0.01s. Divide 20 counters by 10.</p> <p>0.2 is 2 tenths. 2 tenths is equivalent to 20 hundredths. 20 hundredths divided by 10 is 2 hundredths.</p>	<p>Represent division to show the relationship with multiplication. Understand the effect of dividing by 10, 100 and 1,000 on the digits on a place value grid.</p>  <p>Understand how to divide using division by 10, 100 and 1,000.</p> <p>$12 \div 20 = ?$</p> 	<p>Use knowledge of factors to divide by multiples of 10, 100 and 1,000.</p> <p>$40 \div 50 = ?$</p> <p>$40 \rightarrow +10 \rightarrow +5 \rightarrow ?$ $40 \rightarrow +5 \rightarrow +10 \rightarrow ?$</p> <p>$40 \div 5 = 8$ $8 \div 10 = 0.8$ So, $40 \div 50 = 0.8$</p>
<p>Dividing decimals</p>	<p>Use place value equipment to explore division of decimals.</p>  <p>8 tenths divided into 4 groups. 2 tenths in each group.</p>	<p>Use a bar model to represent divisions.</p>  <p>$4 \times 2 = 8$ $8 \div 4 = 2$ So, $4 \times 0.2 = 0.8$ $0.8 \div 4 = 0.2$</p>	<p>Use short division to divide decimals with up to 2 decimal places.</p> 

Tips for helping at home

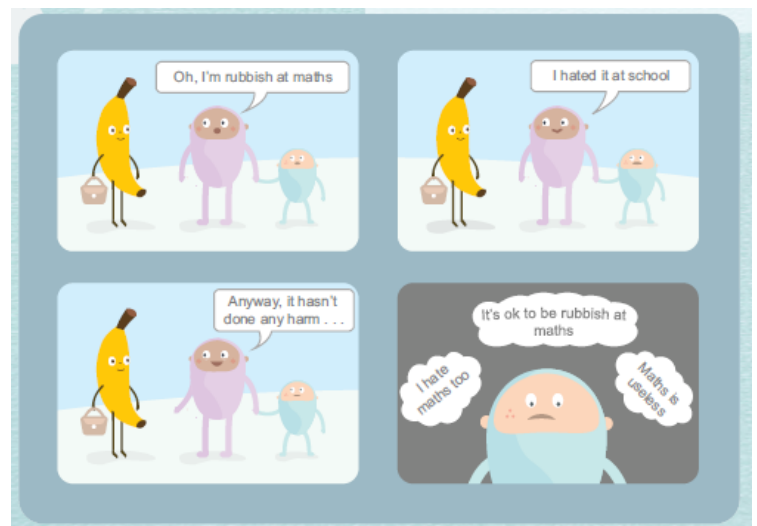


- Find time to show an interest in what your child is learning at school
- Encourage your child to work hard and praise when they've made an effort
- Encourage reading for pleasure by reading to your children at night. This will help with all subjects including maths.
- Create a time for learning at home that fits into the daily routine.
- Find a place for your children to learn where there are no distractions.

Attitudes to Maths

Let's face it we've all got different memories of maths at school. It's easy to let your perceptions of maths affect your child – and this can set them off to a bad start.

Many parents find the prospect of helping their children with maths quite daunting - even if they are pretty good at maths. With a little confidence and some "have-a-go attitude" parents can make a big difference.



Year 6 Expectations:

- Use negative numbers in context and calculate intervals across zero.
- Compare and order numbers up to 10,000,000.
- Identify common factors, common multiples and prime numbers.
- Round any whole number to a required degree of accuracy.
- Identify the value of each digit to 3 decimal places.
- Use knowledge of order of operations to carry out calculations involving four operations.
- Multiply: 4-digit by 2-digit
- Divide: 4-digit by 2-digit
- Add and subtract fractions with different denominators and mixed numbers.
- Multiply simple pairs of proper fractions, writing the answer in the simplest form.
- Divide proper fractions by whole numbers.
- Calculate % of whole number.



Maths is a passport to a world of career opportunities and primary maths is the foundation for this. The goal is developing “Number Sense” - a kind of “maths fluency” which involves applying mental arithmetic accurately and quickly - and intuitively knowing if answers feel right or wrong.

Helping your child with maths at home can be daunting, but most parents are a lot better at maths than they think they are. It’s worth putting on a “have a go” attitude because the extra practice and one-to-one attention can have a big impact. Helping can be as easy as playing a board game or discussing maths with your child. Finally, and most importantly, don’t forget to encourage your child. You don’t always need to understand what your child is learning – showing an interest and encouraging always has a positive effect. Praise works best when it’s for effort and not necessarily for being quick or getting top marks. Praising for effort encourages learners to try harder which promotes a good attitude to learning.