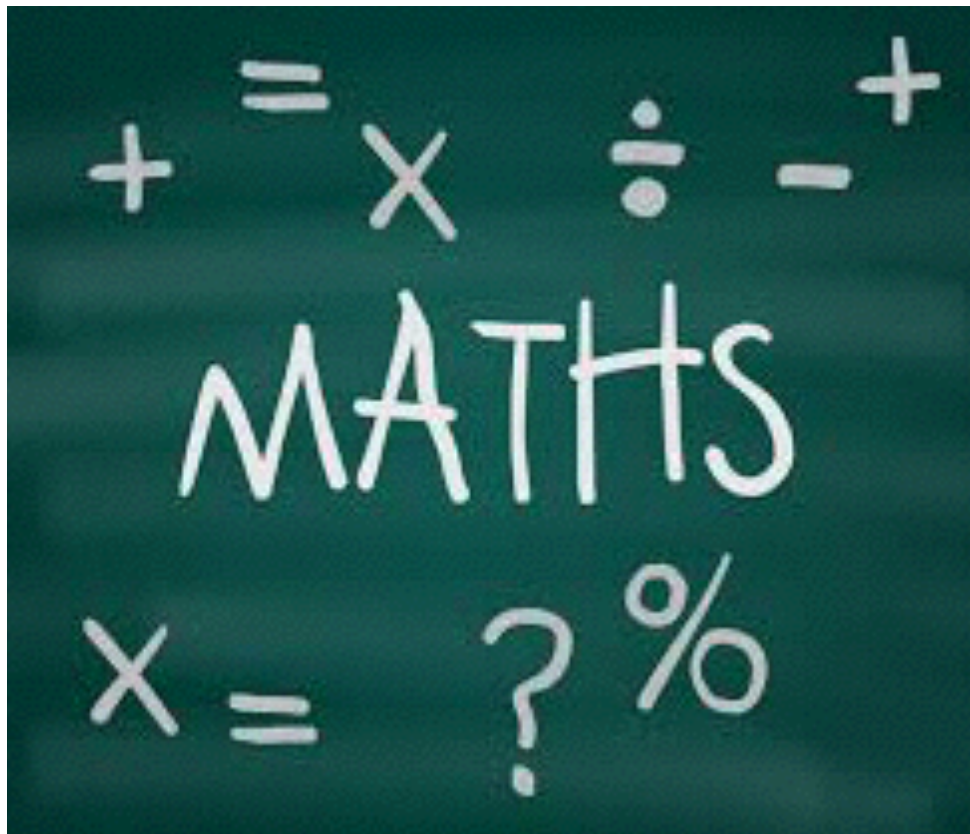
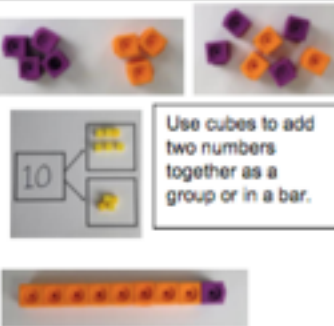
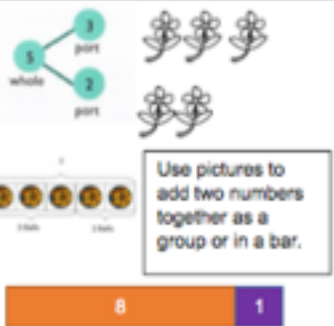



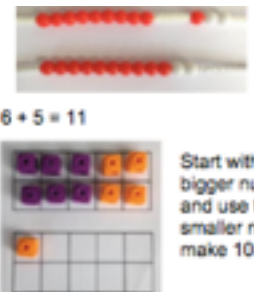
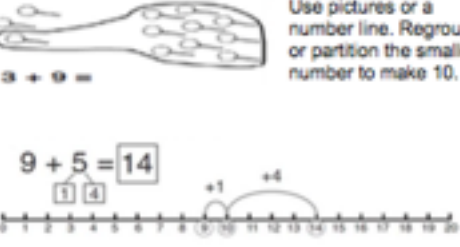

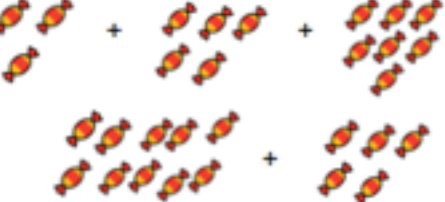
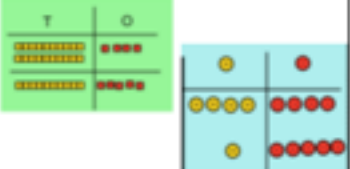
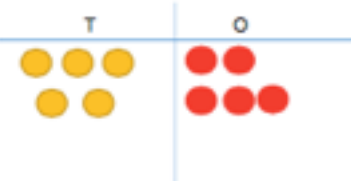


# Maths at Newbold and Tredington Primary School



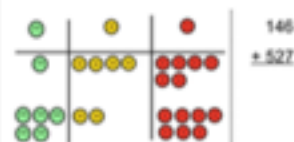
How to help your child  
at home

## Addition

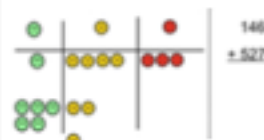
Objective and Strategies	Concrete	Pictorial	Abstract
Combining two parts to make a whole: part-whole model	 <p>Use cubes to add two numbers together as a group or in a bar.</p>	 <p>Use pictures to add two numbers together as a group or in a bar.</p>	$4 + 3 = 7$ $10 = 6 + 4$  <p>Use the part-part whole diagram as shown above to move into the abstract.</p>
Starting at the bigger number and counting on	 <p>Start with the larger number on the bead string and then count on to the smaller number 1 by 1 to find the answer.</p>	$12 + 5 = 17$  <p>Start at the larger number on the number line and count on in ones or in one jump to find the answer.</p>	$5 + 12 = 17$ <p>Place the larger number in your head and count on the smaller number to find your answer.</p>
Regrouping to make 10.	 <p>Start with the bigger number and use the smaller number to make 10.</p>	 <p>Use pictures or a number line. Regroup or partition the smaller number to make 10.</p>	<p>If I am at seven, how many more do I need to make 10. How many more do I add on now?</p>
Adding three single digits	$4 + 7 + 6 = 17$ Put 4 and 6 together to make 10. Add on 7.  <p>Following on from making 10, make 10 with 2 of the digits (if possible) then add on the third digit.</p>	 <p>Add together three groups of objects. Draw a picture to recombine the groups to make 10.</p>	$4 + 7 + 6 = 10 + 7$ $= 17$ <p>Combine the two numbers that make 10 and then add on the remainder.</p>
Column method- no regrouping	$24 + 15 =$ Add together the ones first then add the tens. Use the Base 10 blocks first before moving onto place value counters. 	<p>After practically using the base 10 blocks and place value counters, children can draw the counters to help them to solve additions.</p> 	<p>Calculations</p> $\begin{array}{r} 21 \\ + 42 \\ \hline \end{array}$

## Column method-regrouping

Make both numbers on a place value grid.



Add up the units and exchange 10 ones for one 10.

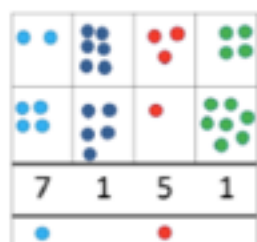


Add up the rest of the columns, exchanging the 10 counters from one column for the next place value column until every column has been added.

This can also be done with Base 10 to help children clearly see that 10 ones equal 1 ten and 10 tens equal 100.

As children move on to decimals, money and decimal place value counters can be used to support learning.

Children can draw a pictorial representation of the columns and place value counters to further support their learning and understanding.



Start by partitioning the numbers before moving on to clearly show the exchange below the addition.

$$\begin{array}{r} 20 + 5 \\ 40 + 8 \\ 60 + 13 = 73 \end{array}$$

$$\begin{array}{r} 536 \\ + 85 \\ \hline 621 \\ 11 \end{array}$$

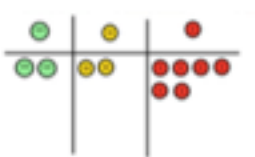
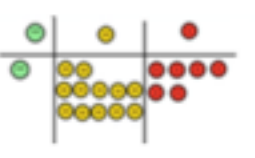
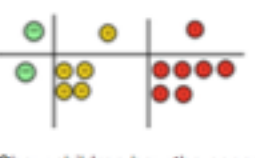
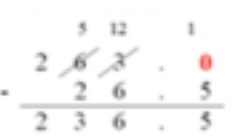
As the children move on, introduce decimals with the same number of decimal places and different. Money can be used here.

$$\begin{array}{r} 72.8 \\ + 54.6 \\ \hline 127.4 \end{array}$$



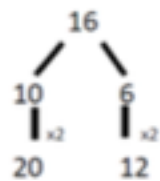
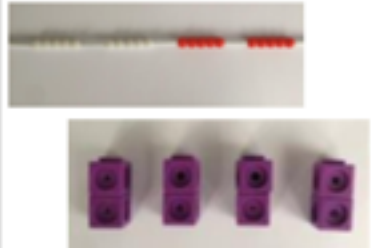

$$\begin{array}{r} 23.61 \\ 9.08 \\ 59.77 \\ + 1.30 \\ \hline 93.76 \end{array}$$


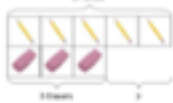
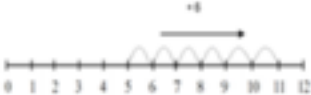
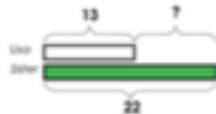
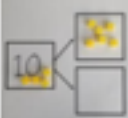




## Subtraction

Objective and Strategies	Concrete	Pictorial	Abstract
<b>Taking away ones</b>	Use physical objects, counters, cubes	Cross out drawn objects to show what has been taken away.	$18 - 3 = 15$
<b>Column method without regrouping</b>	<p>Use Base 10 to make the bigger number then take the smaller number away.</p> <p>Show how you partition numbers to subtract. Again make the larger number first.</p>	<p>Calculations</p> $\begin{array}{r} 36 \\ - 14 \\ \hline 22 \end{array}$ <p>Draw the Base 10 or place value counters alongside the written calculation to help to show working.</p>	$47 - 24 = 23$ $\begin{array}{r} 40 + 7 \\ - 20 + 4 \\ \hline 20 + 3 \end{array}$ <p>This will lead to a clear written column subtraction.</p>
<b>Column method with regrouping</b>	<p>Use Base 10 to start with before moving on to place value counters. Start with one exchange before moving onto subtractions with 2 exchanges.</p> <p>Make the larger number with the place value counters</p> <p>Start with the ones, can I take away 8 from 4 easily? I need to exchange one of my tens for ten ones.</p>	<p>Calculations</p> $\begin{array}{r} 234 \\ - 88 \\ \hline 146 \end{array}$ <p>When confident, children can find their own way to record the exchange/regrouping.</p> <p>Just writing the numbers as shown here shows that the child understands the method and knows when to exchange/regroup.</p>	<p>Children can start their formal written method by partitioning the number into clear place value columns.</p> <p>Moving forward the children use a more compact method.</p>

	<p>Now I can subtract my ones.</p>  <p>Calculations</p> $\begin{array}{r} 234 \\ - 88 \\ \hline \end{array}$ <p>Now look at the tens, can I take away 8 tens easily? I need to exchange one hundred for ten tens.</p>  <p>Calculations</p> $\begin{array}{r} 234 \\ - 88 \\ \hline \end{array}$ <p>Now I can take away eight tens and complete my subtraction</p>  <p>Calculations</p> $\begin{array}{r} 234 \\ - 88 \\ \hline 146 \end{array}$ <p>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.</p>		<p>This will lead to an understanding of subtracting any number including decimals.</p> 
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## Multiplication

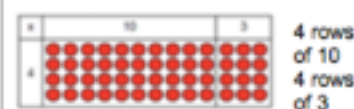
Objective and Strategies	Concrete	Pictorial	Abstract
<p><b>Doubling</b></p>	<p>Use practical activities to show how to double a number.</p>  <p>double 4 is 8 <math>4 \times 2 = 8</math></p>	<p>Draw pictures to show how to double a number.</p> <p>Double 4 is 8</p> 	 <p>Partition a number and then double each part before recombining it back together.</p>
<p><b>Counting in multiples</b></p>	 <p>Count in multiples supported by concrete objects in equal groups.</p>	 <p>Use a number line or pictures to continue support in counting in multiples.</p>	<p>Count in multiples of a number aloud.</p> <p>Write sequences with multiples of numbers.</p> <p>2, 4, 6, 8, 10</p> <p>5, 10, 15, 20, 25, 30</p>

<p><b>Find the difference</b></p>	<p>Compare amounts and objects to find the difference.</p>  <p>Use cubes to build towers or make bars to find the difference</p>  <p>Use basic bar models with items to find the difference</p>	 <p>Count on to find the difference.</p> <p><b>Comparison Bar Models</b></p> <p>Draw bars to find the difference between 2 numbers.</p> <p>Leo is 13 years old. Her sister is 22 years old. Find the difference in age between them.</p> 	<p>Hannah has 23 sandwiches. Helen has 15 sandwiches. Find the difference between the number of sandwiches.</p>
<p><b>Part Part Whole Model</b></p>	<p>Link to addition- use the part whole model to help explain the inverse between addition and subtraction.</p>  <p>If 10 is the whole and 6 is one of the parts. What is the other part?</p> <p><math>10 - 6 =</math></p>	<p>Use a pictorial representation of objects to show the part part whole model.</p> 	 <p>Move to using numbers within the part whole model.</p>
<p><b>Make 10</b></p>	<p><math>14 - 9 =</math></p>  <p>Make 14 on the ten frame. Take away the four first to make 10 and then take away one more so you have taken away 5. You are left with the answer of 9.</p>	<p><math>13 - 7 = \boxed{6}</math></p>  <p>Start at 13. Take away 3 to reach 10. Then take away the remaining 4 so you have taken away 7 altogether. You have reached your answer.</p>	<p><math>16 - 8 =</math></p> <p>How many do we take off to reach the next 10?</p> <p>How many do we have left to take off?</p>

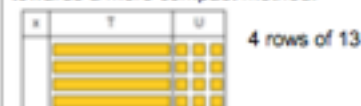


## Grid Method

Show the link with arrays to first introduce the grid method.



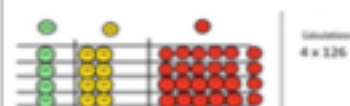
Move on to using Base 10 to move towards a more compact method.



Move on to place value counters to show how we are finding groups of a number. We are multiplying by 4 so we need 4 rows.



Fill each row with 126.



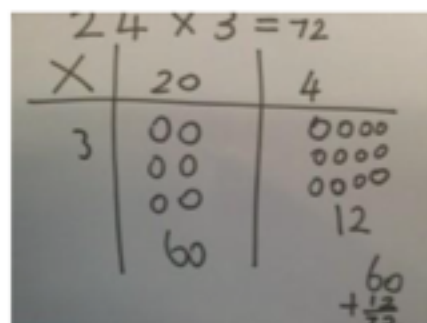
Add up each column, starting with the ones making any exchanges needed.



Then you have your answer.

Children can represent the work they have done with place value counters in a way that they understand.

They can draw the counters, using colours to show different amounts or just use circles in the different columns to show their thinking as shown below.



Start with multiplying by one digit numbers and showing the clear addition alongside the grid.

x	30	5
7	210	35

$$210 + 35 = 245$$

Moving forward, multiply by a 2 digit number showing the different rows within the grid method.

	10	8
10	100	80
3	30	24

x	1000	300	40	2
10	10000	3000	400	20
8	8000	2400	320	16

## Division

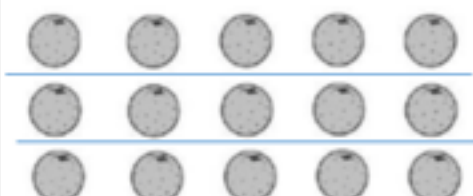
Objective and Strategies	Concrete	Pictorial	Abstract
Sharing objects into groups	<p>I have 10 cubes, can you share them equally in 2 groups?</p>	<p>Children use pictures or shapes to share quantities.</p> $8 \div 2 = 4$	<p>Share 9 buns between three people.</p> $9 \div 3 = 3$
Division as grouping	<p>Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding.</p> <p>10</p> $96 \div 3 = 32$	<p>Use a number line to show jumps in groups. The number of jumps equals the number of groups.</p> <p>Think of the bar as a whole. Split it into the number of groups you are dividing by and work out how many would be within each group.</p> $20 \div 5 = 4$ $5 \times 4 = 20$	$28 \div 7 = 4$ <p>Divide 28 into 7 groups. How many are in each group?</p>

## Division within arrays



Link division to multiplication by creating an array and thinking about the number sentences that can be created.

Eg  $15 \div 3 = 5$      $5 \times 3 = 15$   
 $15 \div 5 = 3$      $3 \times 5 = 15$



Draw an array and use lines to split the array into groups to make multiplication and division sentences.

Find the inverse of multiplication and division sentences by creating four linking number sentences.

$7 \times 4 = 28$   
 $4 \times 7 = 28$   
 $28 \div 7 = 4$   
 $28 \div 4 = 7$

## Division with a remainder

$14 \div 3 =$   
 Divide objects between groups and see how much is left over



Jump forward in equal jumps on a number line then see how many more you need to jump to find a remainder.



Draw dots and group them to divide an amount and clearly show a remainder.



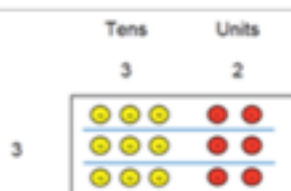
Complete written divisions and show the remainder using r.

$29 \div 5 = 5 \text{ REMAINDER } 4$   
dividend    divisor    quotient    remainder



$3 \times 5 = 15$

## Short division



Use place value counters to divide using the bus stop method alongside



$42 \div 3 =$   
 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.

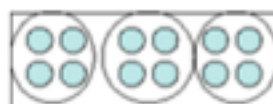


We exchange this ten for ten ones and then share the ones equally among the groups.



We look how much in 1 group so the answer is 14.

Students can continue to use drawn diagrams with dots or circles to help them divide numbers into equal groups.



Encourage them to move towards counting in multiples to divide more efficiently.

Begin with divisions that divide equally with no remainder.

$$\begin{array}{r} 218 \\ 3 \overline{) 654} \end{array}$$

Move onto divisions with a remainder.

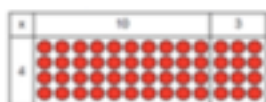
$$\begin{array}{r} 86 \text{ r } 2 \\ 5 \overline{) 432} \end{array}$$

Finally move into decimal places to divide the total accurately.

$$\begin{array}{r} 14.6 \\ 35 \overline{) 511.0} \end{array}$$

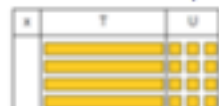
## Grid Method

Show the link with arrays to first introduce the grid method.



4 rows of 10  
4 rows of 3

Move on to using Base 10 to move towards a more compact method.



4 rows of 13

Move on to place value counters to show how we are finding groups of a number. We are multiplying by 4 so we need 4 rows.



Calculations  
 $4 \times 126$

Fill each row with 126.



Calculations  
 $4 \times 126$

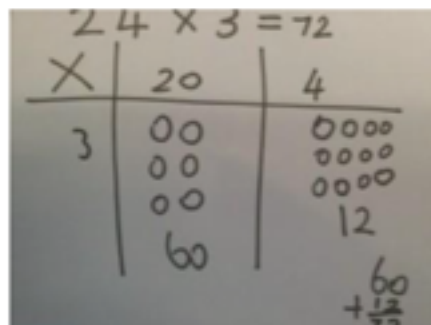
Add up each column, starting with the ones making any exchanges needed.



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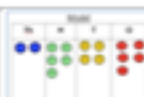
Moving forward, multiply by a 2 digit number showing the different rows within the grid method.

	10	8
10	100	80
3	30	24

x	1000	300	40	2
18	18000	5400	720	36
8	8000	2400	320	16



## Long division



$2544 \div 12$   
How many groups of 12 thousands do we have?  
None

Exchange 2 thousand for 20 hundreds.



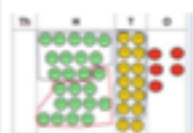
$$12 \overline{) 2544}$$

How many groups of 12 are in 25 hundreds? 2 groups. Circle them.  
We have grouped 24 hundreds so can take them off and we are left with one.



$$12 \overline{) 2544} \\ \underline{24} \\ 1$$

Exchange the one hundred for ten tens so now we have 14 tens. How many groups of 12 are in 14? 1 remainder 2



$$12 \overline{) 2544} \\ \underline{24} \\ 14 \\ \underline{12} \\ 2$$

Exchange the two tens for twenty ones so now we have 24 ones. How many groups of 12 are in 24? 2



$$12 \overline{) 2544} \\ \underline{24} \\ 14 \\ \underline{12} \\ 24 \\ \underline{24} \\ 0$$

Instead of using physical counters, students can draw the counters and circle the groups on a whiteboard or in their books.

Use this method to explain what is happening and as soon as they have understood what move on to the abstract method as this can be a time consuming process.

$$\begin{array}{r} 0318r5 \\ 20 \overline{) 6365} \\ \underline{60} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ 36 \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ \underline{20} \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ 165 \phantom{0} \\ \underline{160} \\ 5 \end{array}$$

# Ways to help your child at home

## Games

Playing games such as Monopoly, darts, snooker etc can help children to become faster at mental maths calculations. Many card and dice games encourage children to calculate mentally, such as Yahtzee, Rummy, Pontoon amongst others.

## To help with number strategies

- Practise the times tables for their year group expectations and their related division facts. Children need to know their 2, 5 and 10 tables by the end of Year 2 and are expected to recall all the way up to  $12 \times 12$  with their divisions by the end of year 4. These need to be **fluent** and answered instantaneously for them to be secure at them.
- Find opportunities for children to work mentally - adding and subtracting within the supermarket, counting out items at home i.e laying the table.
- Doubling and halving within opportunities i.e. I need 10 apples to feed 4 people, how many for 2 people?
- For older children, play matching pairs between fractions, decimals and percentages on blank playing cards.
- Finding different ways to answer mental questions i.e ( $52 + 35 = 87$ ,  $40 + 47 = 87$ ,  $30 + 57 = 87$ )

## To help with money problems

- Allow children to experience the use of real money.
- Asking questions of children such as which is cheaper/more expensive during outings.
- Use a catalogue like Argos and ask children to choose 5 items under £20. Calculate how much they cost and the change from £100 (for older children).

## To help with shape and measures

- Look at recipes and allow children to experience weighing, looking at heavier and lighter and reading of scales.
- Encourage children to work at reading the time or using the language of time - estimating the length of time it takes to achieve a task.
- Involve children with estimating and reading timetables for buses, trains etc.
- Spotting shapes and patterns in everyday life - in nature, around the house etc.
- Encourage children to measure areas using standard units of measure (cm, m, km) as well as non standard (2 pencil lengths long, 3 books high etc).

## End of year expectations for each year group.

These are some brief outlines for each year group of what is expected of a child by the end of the year in maths.

### Year 1

Mathematics		
<b>Number/Calculation</b> <ul style="list-style-type: none"><li>• Count to / across 100</li><li>• Count in 1s, 2s, 5s and 10s</li><li>• Identify 'one more' and 'one less'</li><li>• Read &amp; write numbers to 20</li><li>• Use language, e.g. 'more than', 'most'</li><li>• Use +, - and = symbols</li><li>• Know number bonds to 20</li><li>• add and subtract one-digit and two-digit numbers to 20, including zero</li><li>• Solve one-step problems, including simple arrays</li></ul>	<b>Geometry &amp; Measures</b> <ul style="list-style-type: none"><li>• Use common vocabulary for comparison, e.g. heavier, taller, full, longest, quickest</li><li>• Begin to measure length, capacity, weight</li><li>• Recognise coins &amp; notes</li><li>• Use time &amp; ordering vocabulary</li><li>• Tell the time to hour/half-hour</li><li>• Use language of days, weeks, months &amp; years</li><li>• Recognise &amp; name common 2-d and 3-d shapes</li><li>• Order &amp; arrange objects</li></ul>	<ul style="list-style-type: none"><li>• Describe position &amp; movement, including half and quarter turns</li></ul> <b>Fractions</b> <ul style="list-style-type: none"><li>• Recognise &amp; use <math>\frac{1}{2}</math> &amp; <math>\frac{1}{4}</math></li></ul>

### Year 2

Mathematics		
<b>Number/Calculation</b> <ul style="list-style-type: none"><li>• Know 2, 5, 10x tables</li><li>• Begin to use place value (T/U)</li><li>• Count in 2s, 3s, 5s &amp; 10s</li><li>• Identify, represent &amp; estimate numbers</li><li>• Compare / order numbers, inc. &lt; &gt; =</li><li>• Write numbers to 100</li><li>• Know number facts to 20 (+ related to 100)</li><li>• Use x and ÷ symbols</li><li>• Recognise commutative property of multiplication</li></ul>	<b>Geometry &amp; Measures</b> <ul style="list-style-type: none"><li>• Know and use standard measures</li><li>• Read scales to nearest whole unit</li><li>• Use symbols for £ and p and add/subtract simple sums of less than £1 or in pounds</li><li>• Tell time to the nearest 5 minutes</li><li>• Identify &amp; sort 2-d &amp; 3-d shapes</li><li>• Identify 2-d shapes on 3-d surfaces</li><li>• Order and arrange mathematical objects</li><li>• Use terminology of position &amp; movement</li></ul>	<b>Fractions</b> <ul style="list-style-type: none"><li>• Find and write simple fractions</li><li>• Understand equivalence of e.g. <math>\frac{2}{4} = \frac{1}{2}</math></li></ul> <b>Data</b> <ul style="list-style-type: none"><li>• Interpret simple tables &amp; pictograms</li><li>• Ask &amp; answer comparison questions</li><li>• Ask &amp; answer questions about totalling</li></ul>

### Year 3

Mathematics		
<b>Number/Calculation</b> <ul style="list-style-type: none"><li>• Learn 3, 4 &amp; 8x tables</li><li>• Secure place value to 100</li><li>• Mentally add &amp; subtract units, tens or hundreds to numbers of up to 3 digits</li><li>• Written column addition &amp; subtraction</li><li>• Solve number problems, including multiplication &amp; simple division and missing number problems</li><li>• Use commutativity to help calculations</li></ul>	<b>Geometry &amp; Measures</b> <ul style="list-style-type: none"><li>• Measure &amp; calculate with metric measures</li><li>• Measure simple perimeter</li><li>• Add/subtract using money in context</li><li>• Use Roman numerals up to XII; tell time</li><li>• Calculate using simple time problems</li><li>• Draw 2-d / Make 3-d shapes</li><li>• Identify and use right angles</li><li>• Identify horizontal, vertical, perpendicular and parallel lines</li></ul>	<b>Fractions &amp; decimals</b> <ul style="list-style-type: none"><li>• Use &amp; count in tenths</li><li>• Recognise, find &amp; write fractions</li><li>• Recognise some equivalent fractions</li><li>• Add/subtract fractions up to <math>&lt;1</math></li><li>• Order fractions with common denominator</li></ul> <b>Data</b> <ul style="list-style-type: none"><li>• Interpret bar charts &amp; pictograms</li></ul>

## Year 4

Mathematics		
<b>Number/Calculation</b>	<b>Geometry &amp; Measures</b>	<b>Fractions &amp; decimals</b>
<ul style="list-style-type: none"> <li>Know all tables to 12 x 12</li> <li>Secure place value to 1000</li> <li>Use negative whole numbers</li> <li>Round numbers to nearest 10, 100 or 1000</li> <li>Use Roman numerals to 100 (C)</li> <li>Column addition &amp; subtraction up to 4 digits</li> <li>Multiply &amp; divide mentally</li> <li>Use standard short multiplication</li> </ul>	<ul style="list-style-type: none"> <li>Compare 2-d shapes, including quadrilaterals &amp; triangles</li> <li>Find area by counting squares</li> <li>Calculate rectangle perimeters</li> <li>Estimate &amp; calculate measures</li> <li>Identify acute, obtuse &amp; right angles</li> <li>Identify symmetry</li> <li>Use first quadrant coordinates</li> <li>Introduce simple translations</li> </ul>	<ul style="list-style-type: none"> <li>Recognise tenths &amp; hundredths</li> <li>Identify equivalent fractions</li> <li>Add &amp; subtract fractions with common denominators</li> <li>Recognise common equivalents</li> <li>Round decimals to whole numbers</li> <li>Solve money problems</li> </ul>
	<b>Data</b>	
	<ul style="list-style-type: none"> <li>Use bar charts, pictograms &amp; line graphs</li> </ul>	

## Year 5

Mathematics		
<b>Number/Calculation</b>	<b>Geometry &amp; Measures</b>	<b>Fractions</b>
<ul style="list-style-type: none"> <li>Secure place value to 1,000,000</li> <li>Use negative whole numbers in context</li> <li>Use Roman numerals to 1000 (M)</li> <li>Use standard written methods for all four operations</li> <li>Confidently add &amp; subtract mentally</li> <li>Use vocabulary of prime, factor &amp; multiple</li> <li>Multiply &amp; divide by powers of ten</li> <li>Use square and cube numbers</li> </ul>	<ul style="list-style-type: none"> <li>Convert between different units</li> <li>Calculate perimeter of composite shapes &amp; area of rectangles</li> <li>Estimate volume &amp; capacity</li> <li>Identify 3-d shapes</li> <li>Measure &amp; identify angles</li> <li>Understand regular polygons</li> <li>Reflect &amp; translate shapes</li> </ul>	<ul style="list-style-type: none"> <li>Compare &amp; order fractions</li> <li>Add &amp; subtract fractions with common denominators, with mixed numbers</li> <li>Multiply fractions by units</li> <li>Write decimals as fractions</li> <li>Order &amp; round decimal numbers</li> <li>Link percentages to fractions &amp; decimals</li> </ul>
	<b>Data</b>	
	<ul style="list-style-type: none"> <li>Interpret tables &amp; line graphs</li> <li>Solve questions about line graphs</li> </ul>	

## Year 6

Mathematics		
<b>Number/Calculation</b>	<b>Geometry &amp; Measures</b>	<b>Fractions, decimals &amp; percentages</b>
<ul style="list-style-type: none"> <li>Secure place value &amp; rounding to 10,000,000, including negatives</li> <li>All written methods, including long division</li> <li>Use order of operations (not indices)</li> <li>Identify factors, multiples &amp; primes</li> <li>Solve multi-step number problems</li> </ul>	<ul style="list-style-type: none"> <li>Confidently use a range of measures &amp; conversions</li> <li>Calculate area of triangles / parallelograms</li> <li>Use area &amp; volume formulas</li> <li>Classify shapes by properties</li> <li>Know and use angle rules</li> <li>Translate &amp; reflect shapes, using all four quadrants</li> </ul>	<ul style="list-style-type: none"> <li>Compare &amp; simplify fractions</li> <li>Use equivalents to add fractions</li> <li>Multiply simple fractions</li> <li>Divide fractions by whole numbers</li> <li>Solve problems using decimals &amp; percentages</li> <li>Use written division up to 2dp</li> <li>Introduce ratio &amp; proportion</li> </ul>
<b>Algebra</b>	<b>Data</b>	
<ul style="list-style-type: none"> <li>Introduce simple use of unknowns</li> </ul>	<ul style="list-style-type: none"> <li>Use pie charts</li> <li>Calculate mean averages</li> </ul>	