

Bampton CE Primary School and Nursery

Learning together with Respect, Friendship and Perseverance



School Vision Statement

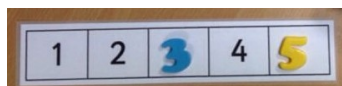
We endeavour to enable individuals in our school community to learn together, grow in respect, tolerance and understanding of the world in which we live, embrace Christian values and reach our full potential.

Title of Policy	Calculation Policy
Date Adopted by the Governing Body	October 2022
Review Date	October 2024
Signed by the Chair of Governors	

Basic Principles of Mathematics

Ordinality

The ordering of numbers

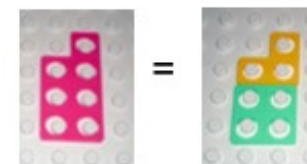


Cardinality

The value of a number



Equality



Subitising

Instantly recognising the number of object in a small group without counting them

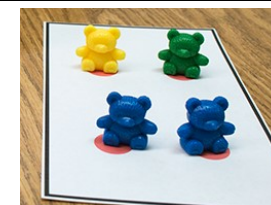


Conservation of number

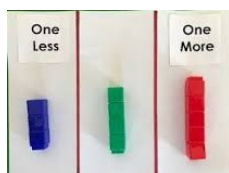
Recognising that the value of objects are the same, even if they are laid out differently.



One to one correspondence



One more, one less



Counting on and back

pics



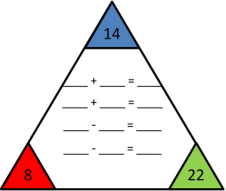
Doubling, halving and sharing



Key Vocabulary

zero, number, one, two, three ... to twenty and beyond, teens numbers, eleven, twelve ... twenty, none, how many ...?, count, count (up) to, count on (from, to), count back (from, to) count in ones, is the same as more, less odd, is the same number as, as many as, more, larger, bigger, greater fewer, smaller, less, fewest, smallest, least, most, biggest, largest, greatest one more, one less, compare, order, first, second, third... , last, last but one, before, after, next, between, add, more, and make, sum, total altogether, double, one more, two more ... ten more how many more to make ...?, how many more is ... than ...?, how much more is ...?, take away how many are left/left over?, how many have gone?, one less, two less, ten less ... how many fewer is ... than ...?, how much less is ...?, difference between, sharing, doubling, halving

Mental Strategies for Addition and Subtraction

Number bonds and related number bond facts $7 + 3 = 10$ $70 + 30 = 100$ $0.7 = 0.3 = 1$	Doubles $7 + 7 = 14$ $20 - 10 = 10$	Near doubles $7 + 7 = 14$ so $7 + 8 = 15$
Commutative law of addition $7 + 68$ is equivalent to $68 + 7$	Using the inverse <div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 20px;"> $14 + 8 = 22$ $8 + 14 = 22$ $22 - 14 = 8$ $22 - 8 = 14$ </div>  </div>	Partitioning both numbers <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> $52 + 42 =$ $50 + 40 + 2 + 2 =$ $90 + 4 = 94$ </div> <div style="width: 45%;"> $76 - 24 =$ $70 - 20 + 6 - 4 =$ $50 + 4 = 52$ </div> </div>
Partitioning one number (Sequencing) <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> $52 + 42 =$ $52 + 40 + 2 = 92$ </div> <div style="width: 45%;"> $76 - 24 =$ $76 - 20 - 4 = 52$ </div> </div>	Compensation In compensation we use our knowledge of place value and rounding. This strategy is particularly useful for working with numbers ending in 1, 2, 8 and 9 $673 + 99$ $673 + 100 - 1 = 772$ $46 - 18$ $46 - 20 + 2 = 28$	Balancing In balancing we alter both numbers to make a calculation easier to complete, often using our knowledge of place value and rounding. <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> $58 + 26$ $58 + 2 = 60$ $26 - 2 = 24$ $60 + 24 = 84$ </div> <div style="width: 45%;"> $58 - 26$ $58 + 4 = 62$ $26 + 4 = 30$ $62 - 30 = 32$ </div> </div>

Glossary

Addend - A number to be added to another.

Aggregation - combining two or more quantities or measures to find a total.

Augmentation - increasing a quantity or measure by another quantity.

Commutative - numbers can be added in any order.

Complement - in addition, a number and its complement make a total e.g. 300 is the complement to 700 to make 1,000

Difference - the numerical difference between two numbers is found by comparing the quantity in each group.

Exchange - Change a number or expression for another of an equal value.

Minuend - A quantity or number from which another is subtracted.

Partitioning - Splitting a number into its component parts.

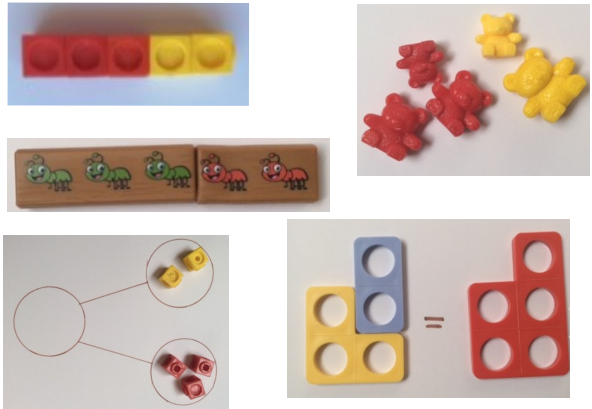
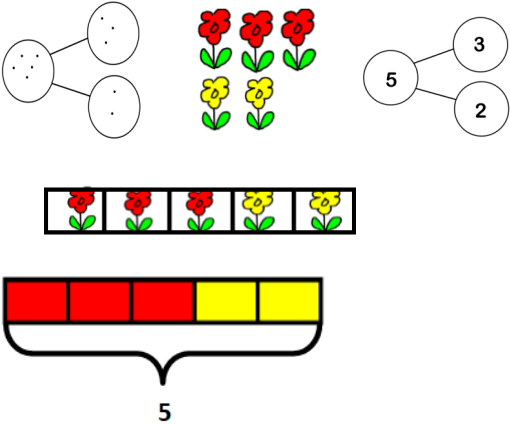

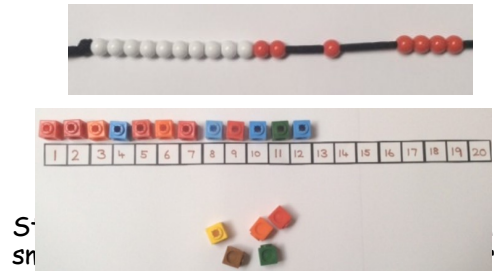
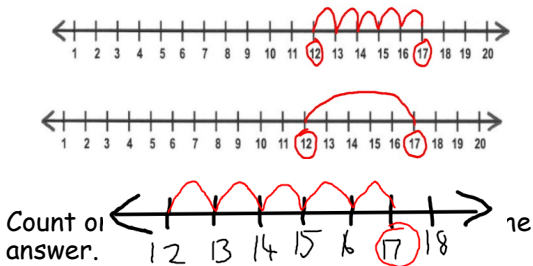
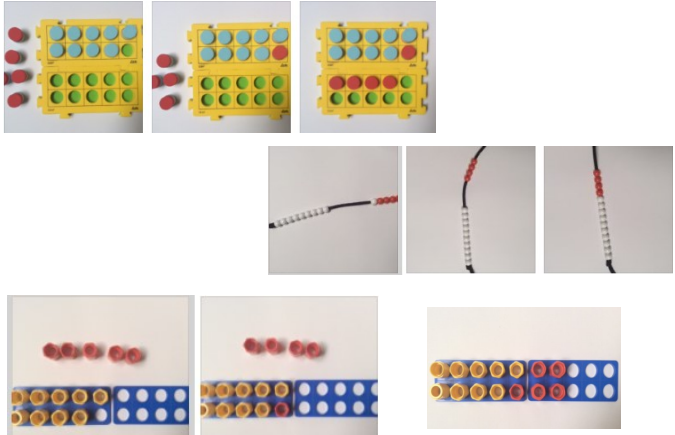
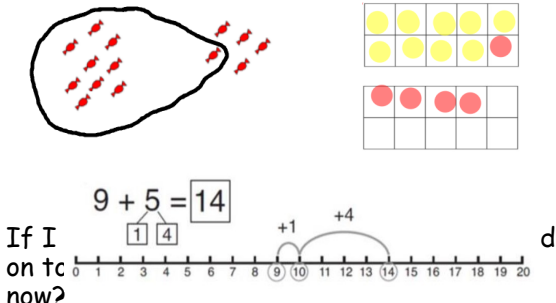
Reduction - Subtraction as take away.

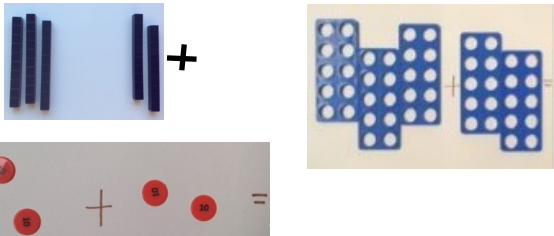
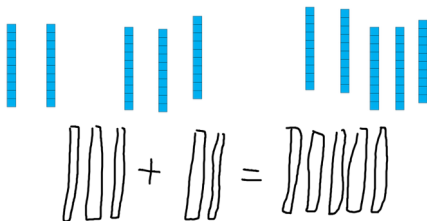
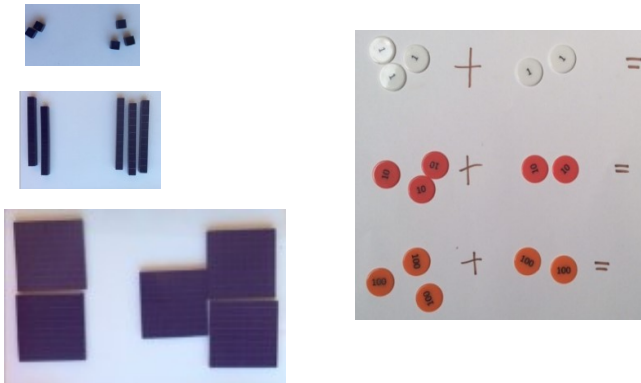
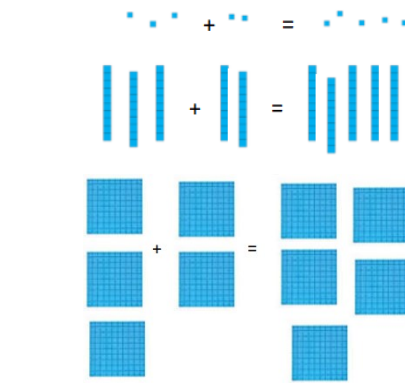
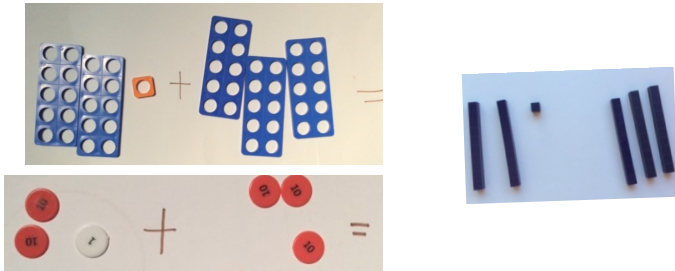
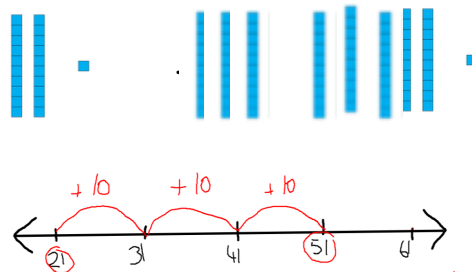
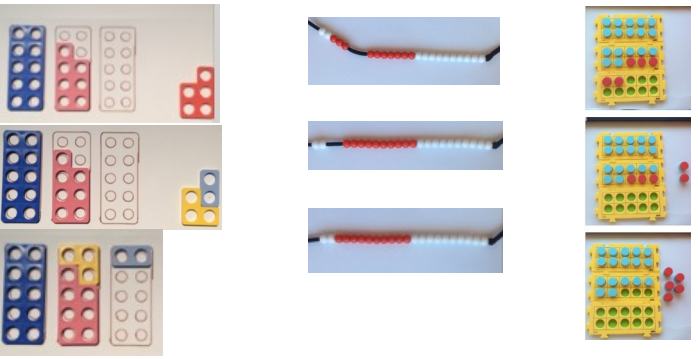
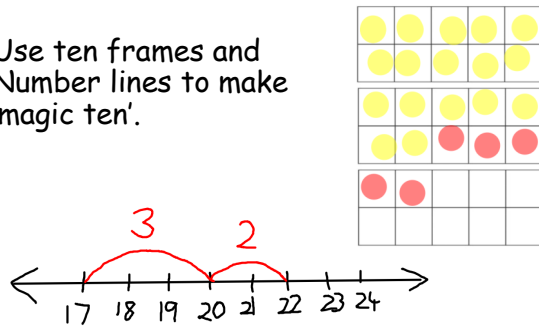
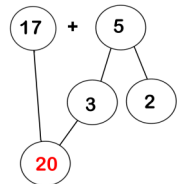
Subitise - Instantly recognise the number of objects in a small group without needing to count.




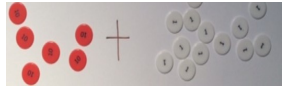
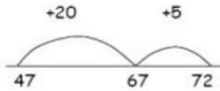
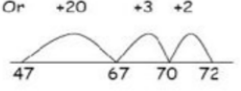




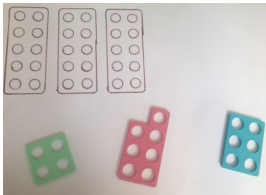
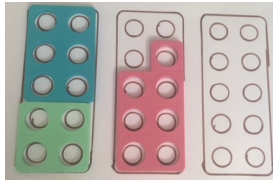

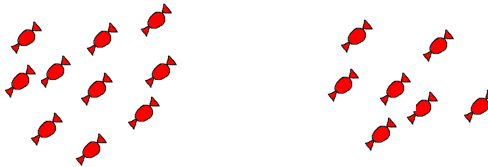
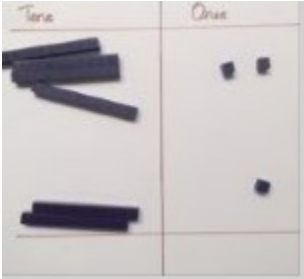
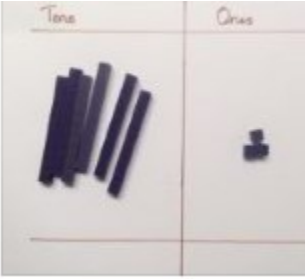
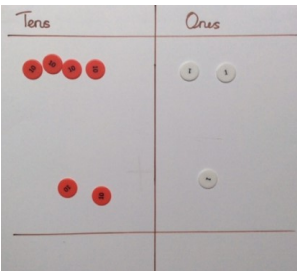
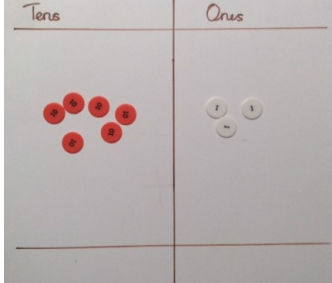
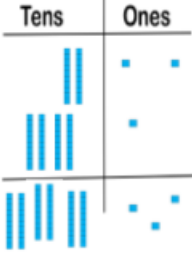
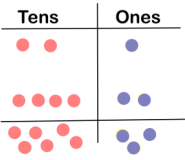
Subtrahend - A number to be subtracted from another.

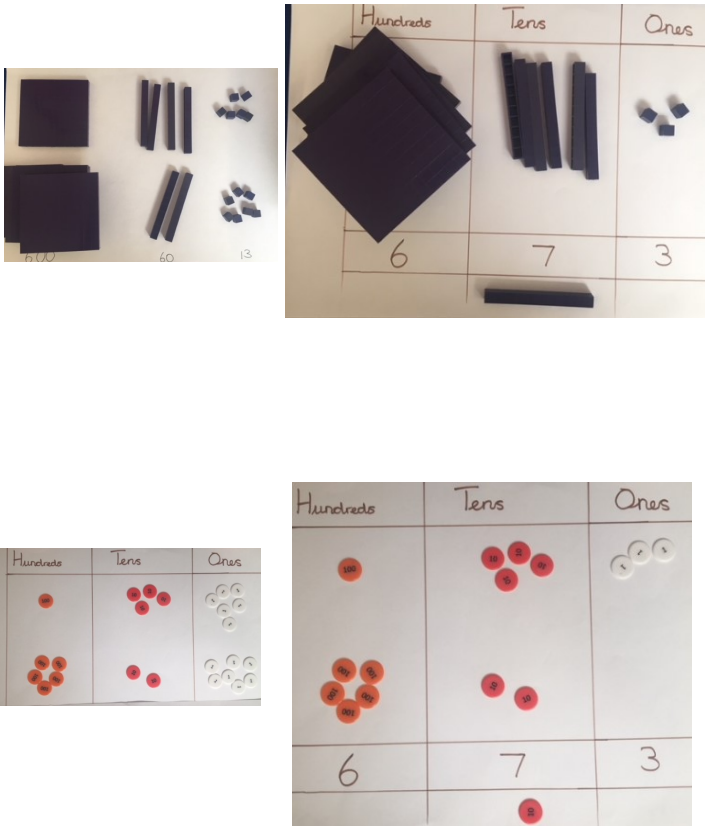
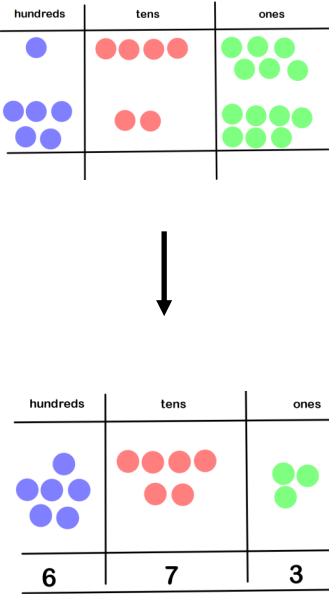
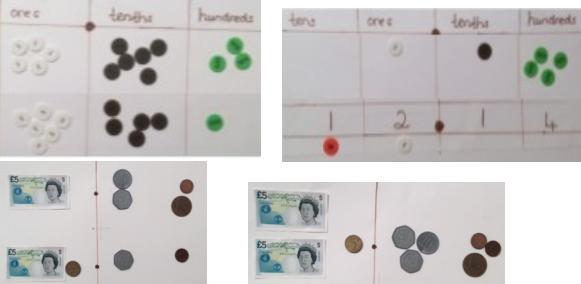
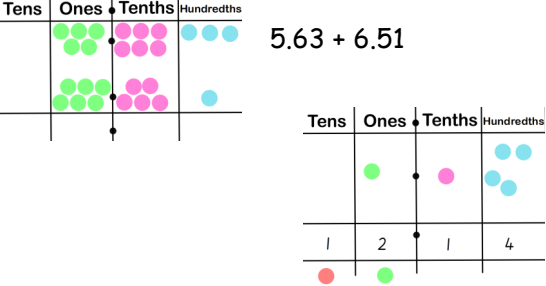
Sum - The result of an addition.

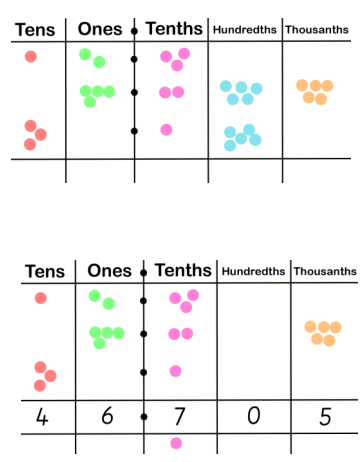
Total - The aggregate or the sum found by addition.

Objective	Concrete	Pictorial	Abstract
Combining two parts to make a whole: part - part - whole model			$3 + 2 = 5$ $2 + 3 = 5$ $5 = 3 + 2$ $5 = 2 + 3$ 
Starting with the bigger number and counting on	 <p>Start at 12 and count on 5 to find the answer.</p>		$12 + 5 = 17$ $17 = 12 + 5$ <p>Place the larger number in your head and count on the smaller number to find your answer.</p>
Regrouping to make 10.		 <p>If I know 9 + 5 = 14, then I can find 9 + 5 = 14.</p>	$9 + 5 = 14$ <p>Partition the smaller number to make 10.</p> $9 + 5 = 14$ $14 = 9 + 5$

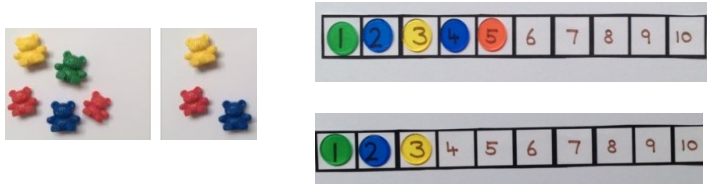


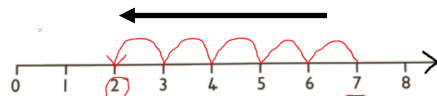
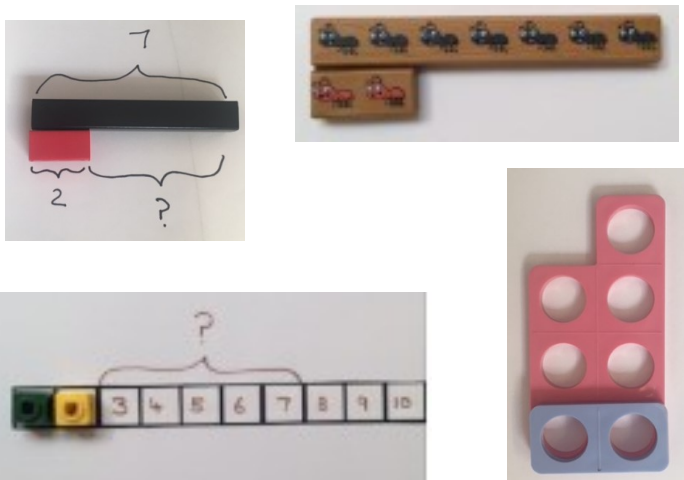
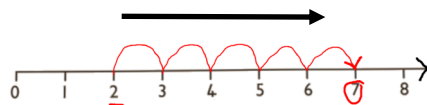
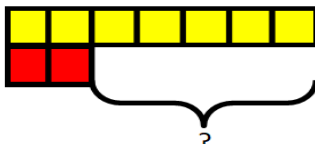
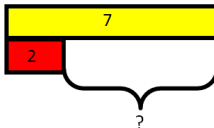
Objective	Concrete	Pictorial	Abstract
Adding multiples of ten			$20 + 30 = 50$ $30 + ? = 50$ $50 = 30 + 20$ 3 tens add 2 tens is _____ tens
Using known number facts			$3 + 2 = 5$ <i>leads to</i> $30 + 20 = 50$ <i>leads to</i> $300 + 200 = 500$
Adding a two-digit number and tens			$21 + 30 = 51$ $21 + ? = 51$ Explore the fact that the ones digit does not change.
Adding a two digit number and ones using base 10		Use ten frames and Number lines to make 'magic ten'. 	$17 + 5 = 22$ $17 + 3 = 20$ $20 + 2 = 22$ $5 + 17 = 22$ $22 - 5 = 17$ $22 - 17 = 5$ facts 

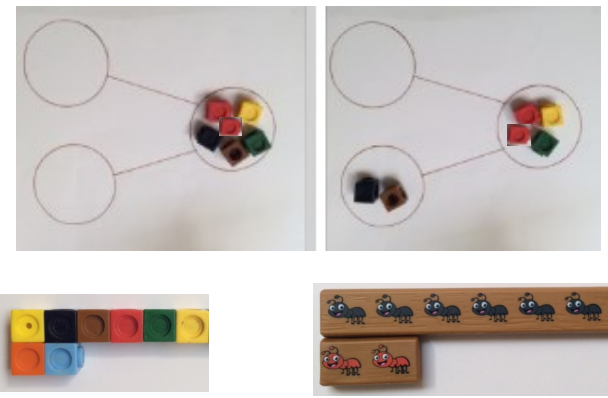
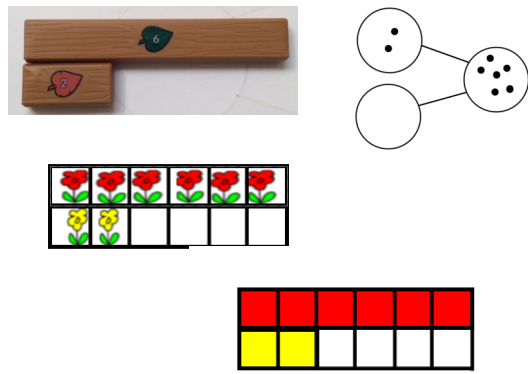
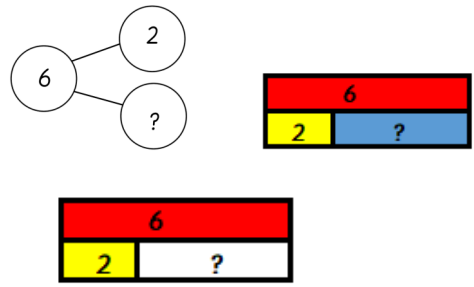
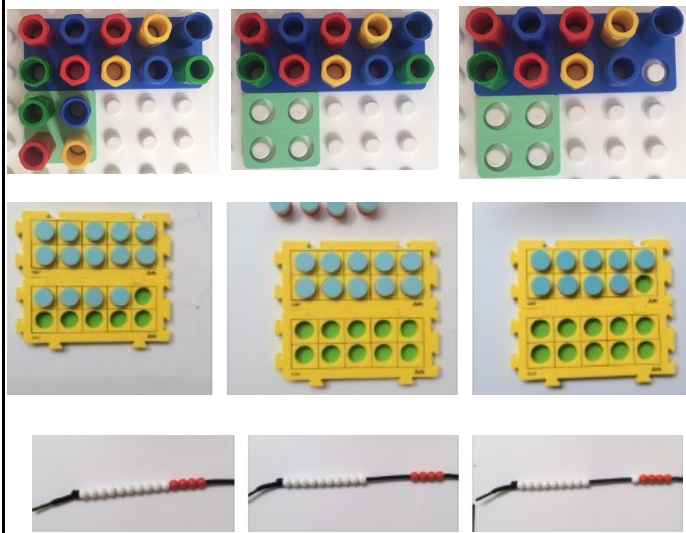
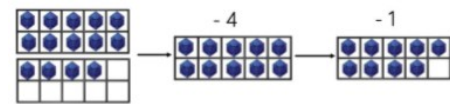
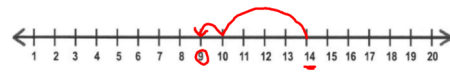
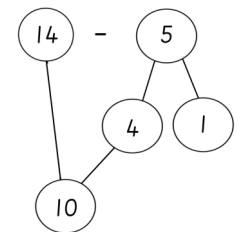
Objective	Concrete	Pictorial	Abstract
Adding two two-digit numbers using partitioning	   	   	$47 + 25$ $\begin{array}{r} 47 \\ + 25 \\ \hline 20 \quad 5 \end{array}$ $47 + 20 = 67$ $67 + 5 = 72$ $47 + 25$ $\begin{array}{r} 47 \\ + 25 \\ \hline 40 \quad 20 \quad 5 \end{array}$ $40 + 20 = 60$ $7 + 5 = 12$ $60 + 12 = 72$
Add three one-digit numbers	   	 <p>Regroup and redraw.</p> 	$\textcircled{4} + 7 + \textcircled{6} = \textcircled{10} + 7$ $= 17$ <p>Combine the two numbers that make/bridge ten then add the third.</p>
Column method - no re-grouping	   	 <p>Draw dienes using a tens and ones frame.</p>  <p>Draw counters using a tens and ones frame.</p>	<p>Start by partitioning the numbers before moving onto formal column addition.</p> $\begin{array}{r} 42 \\ + 21 \\ \hline 63 \end{array}$ $\begin{array}{r} 40 + 2 \\ + 20 + 1 \\ \hline 60 + 3 = 63 \end{array}$ <p>then the tens.</p> <p>Add the ones first, then the tens and finally the hundreds.</p> $\begin{array}{r} 223 \\ + 145 \\ \hline 368 \end{array}$

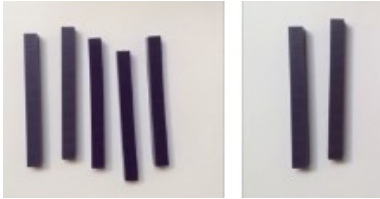

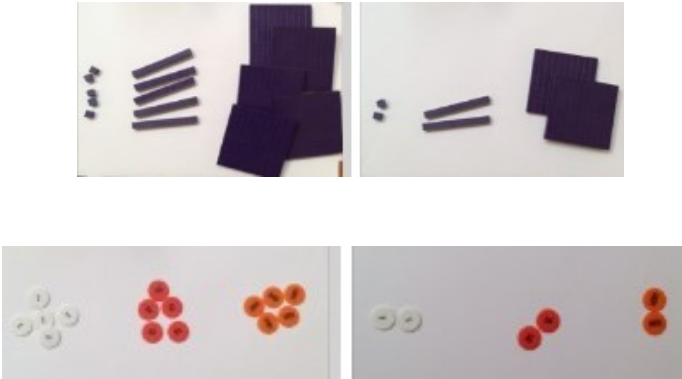
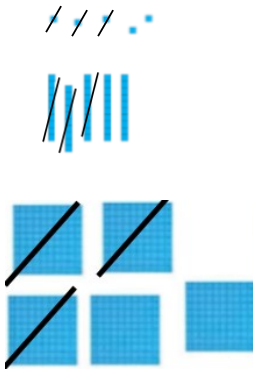
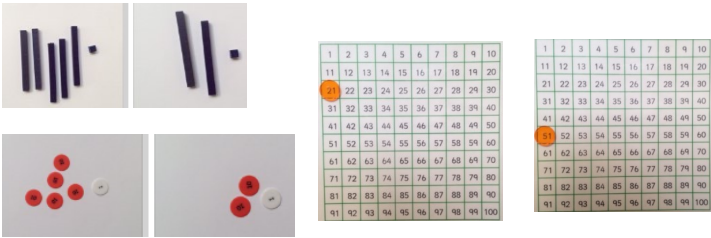

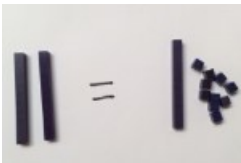

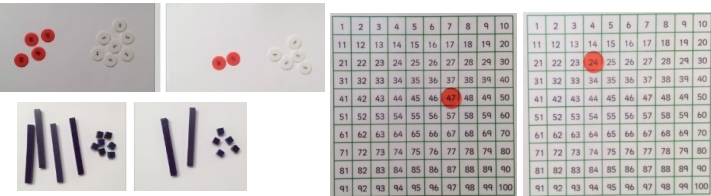

Objective	Concrete	Pictorial	Abstract
Column method - with re-grouping		<p>Add up all the ones and exchange ten ones for one ten. Place this counter underneath.</p> $146 + 527 = 673$ 	<p>Start by partitioning the numbers before moving onto formal column addition.</p> $100 + 40 + 6$ $+ 500 + 20 + 7$ $600 + 60 + 13 = 673$ <p>13 ones. Exchange 10 ones for 1 ten. We now have 1 ten and 3 ones. Write the 1 ten in the tens column below the answer line. Write the 3 straight into the ones column.</p> $\begin{array}{r} 146 \\ + 527 \\ \hline 3 \end{array}$ <p>Now add the tens. 4 tens add 2 tens add 1 ten is 7 tens. Write 7 in the tens column.</p> $\begin{array}{r} 146 \\ + 527 \\ \hline 73 \end{array}$ <p>Next add the hundreds. 1 hundred add 5 hundreds is 6 hundreds. Write 5 in the hundreds column.</p> $\begin{array}{r} 146 \\ + 527 \\ \hline 673 \end{array}$
Add decimals with two decimal places		<p>Line up the decimal points.</p> $5.63 + 6.51$ 	<p>Line up the decimal points.</p> $\begin{array}{r} 5.63 \\ + 6.51 \\ \hline 12.14 \end{array}$

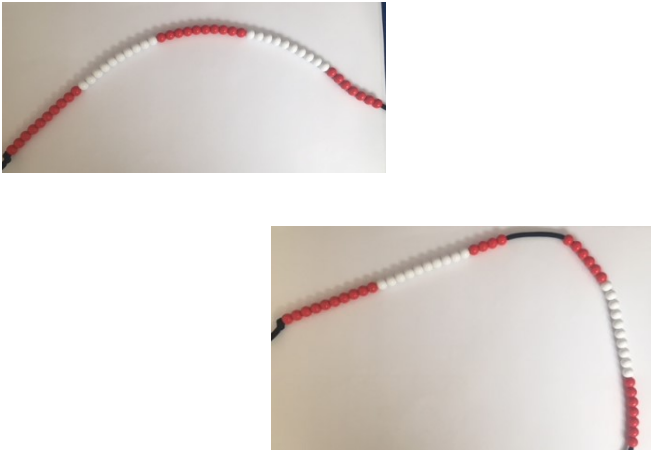
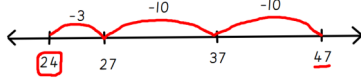
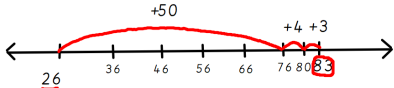
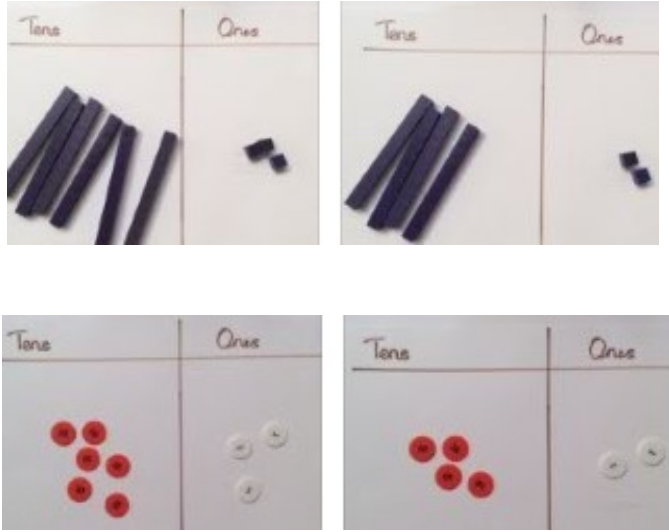
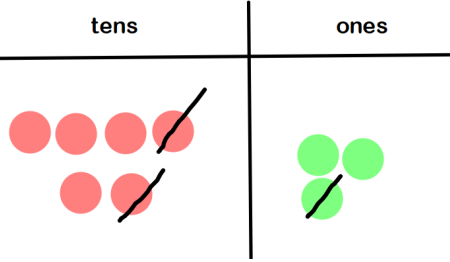
Objective	Concrete	Pictorial	Abstract
Add several numbers of increasing complexity		<p>$12.3 + 4.255 + 30.15$</p> 	<p>Line up decimal points.</p> $\begin{array}{r} 12.3 \\ 4.255 \\ + 30.15 \\ \hline 46.705 \end{array}$ <p>Insert zero for place holders to avoid place value mistakes.</p> $\begin{array}{r} 12.300 \\ 4.255 \\ + 30.150 \\ \hline 46.705 \end{array}$

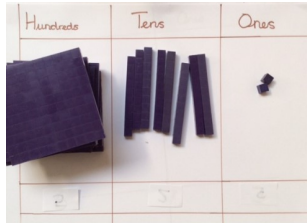
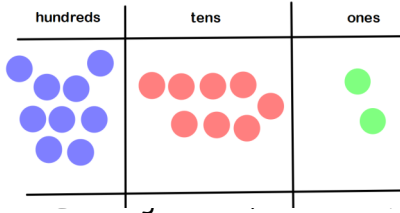
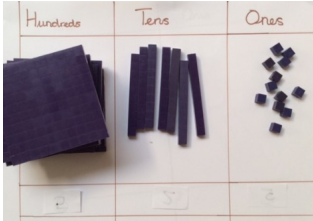
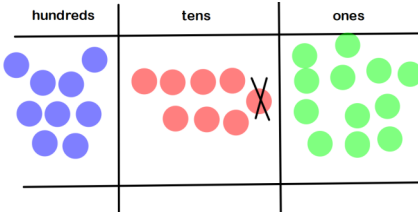
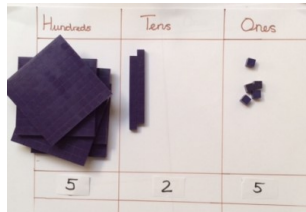
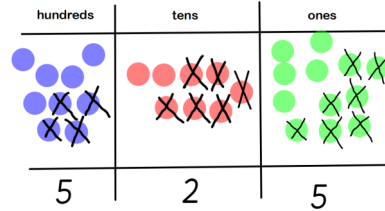
Key Stage	Key Vocabulary
KS1	add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, number line, sum, tens, ones, partition, addition, column, Subitise, commutative
LKS2	add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, number line, sum, tens, ones partition, plus, addition, column, tens boundary, hundreds boundary, increase, vertical, 'exchange, expanded, compact, thousands, hundreds, digits, inverse, complement, addend ,subitise,commutative
UKS2	add, more, plus, and, make, altogether, total, equal to, equals, double, most, count on, number line, sum, tens, ones, partition, plus, addition, column, tens boundary, hundreds boundary, increase, exchange, expanded, compact, vertical, thousands, hundreds, digits, inverse, decimal places, decimal point, tenths, hundredths, thousandths, complement, addend, aggregation, augmentation, commutative

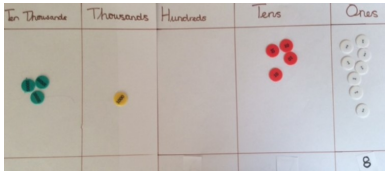
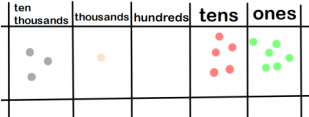
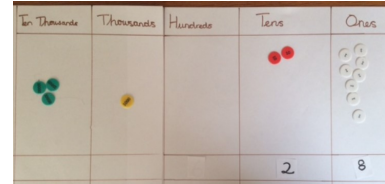
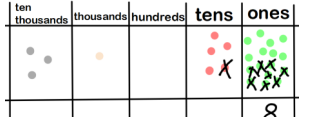
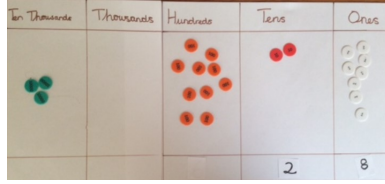

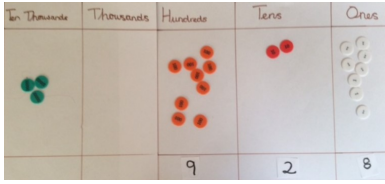
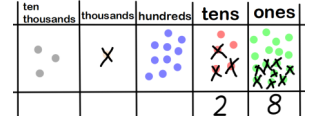
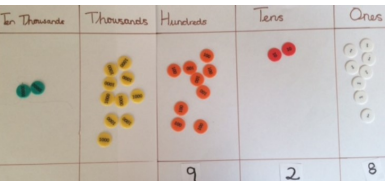
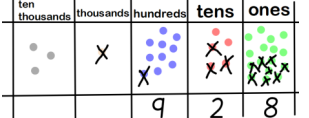
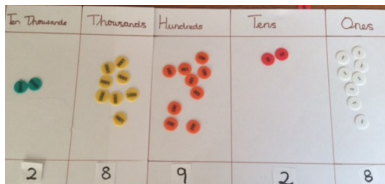
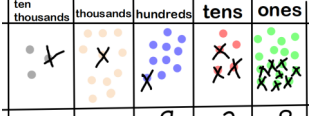

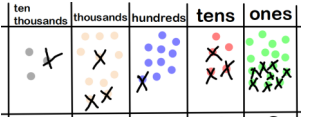
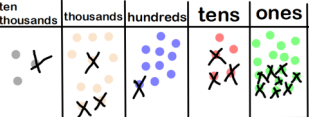
Objective	Concrete	Pictorial	Abstract
Taking away ones		<p>Cross out drawn subjects to show what has been taken away</p> 	$5 - 2 = 3$
Counting back	 <p>Make the larger number on your bead string. Move the beads along your bead string as you count backwards in ones.</p>	<p>Count back on the number line or number track.</p> <p>$7 - 5 = 2$</p>  <p>Start at the bigger number and count back the smaller number</p>	<p>Put 7 in your head and count back 5. What number are you at?</p> $7 - 5 = 2$
Find the difference		<p>Count on using the number line or number track to find the difference.</p>  <p>Start at the smaller number and count up to the bigger number.</p> 	<p>Hannah has 7 crayons and Sarah has 2 crayons. How many more crayons does Hannah have?</p> 

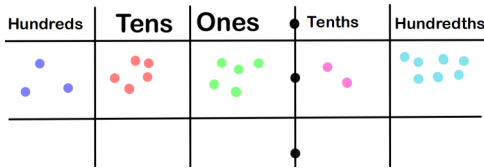
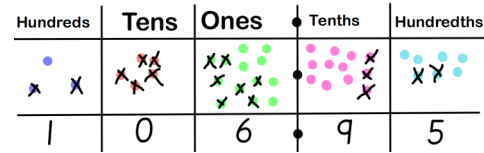
Objective	Concrete	Pictorial	Abstract
Part - part - whole method			<p>$2 + ? = 6$</p> 
Regrouping to make 10		<p>Start by making 14. Take 4 away to make 10. Now take 1 more away so you have subtracted 5.</p>  <p>Use 10 as a stopping point. Jump back 4 first then another 1.</p> 	<p>$14 - 5 = 9$</p> <p>How many do we take off first to get to 10? How many left to take off?</p> 

Objective	Concrete	Pictorial	Abstract
Subtracting multiples of ten			$50 - 30 = 20$ $20 = 50 - 30$ 5 tens subtract 3 tens is _____ tens
Using known number facts			$5 - 3 = 2$ <i>leads to</i> $50 - 30 = 20$ <i>leads to</i> $500 - 300 = 200$
Subtracting tens from a two-digit number			$51 - 30 = 21$ $51 - ? = 21$ Explore the fact that the ones digit does not change.
Regrouping tens into 10 ones			$20 - 4 = 16$
Partitioning to subtract without regrouping			$47 - 22 = 25$ $40 - 20 = 20$ $7 - 2 = 5$ $20 + 5 = 25$

Objective	Concrete	Pictorial	Abstract
Partitioning - counting back and on in tens then ones		<p>Use the number line to count back in tens and then the rest.</p>  <p>Use a number line to count on in tens and then the rest</p> 	$47 - 23 = 24$ $83 - ? = 26$ What is the difference between 83 and 26?
Column method - no re-grouping			<p>Start by portioning numbers before moving onto formal column subtraction.</p> $\begin{array}{r} 60 + 3 \\ - 20 + 1 \\ \hline 40 + 2 = 42 \end{array}$ $\begin{array}{r} 63 \\ - 21 \\ \hline 42 \end{array}$ <p>Subtract the ones first then the tens.</p>

Objective	Concrete	Pictorial	Abstract
Column method - re-grouping		<p>982 - 457</p> 	<p>Start by partitioning numbers before moving onto formal column subtraction.</p> <p>2 subtract 7 is not possible. We need to exchange 1 ten for 10 ones.</p> $\begin{array}{r} 900 + 80 + 2 \\ - 400 + 50 + 7 \\ \hline \end{array}$
			<p>12 subtract 7 equals 5.</p> $\begin{array}{r} 900 + 80 + 2 \\ - 400 + 50 + 7 \\ \hline 500 \end{array}$
			<p>70 subtract 50 equals 20. 900 subtract 400 equals 500.</p> $\begin{array}{r} 900 + 80 + 2 \\ - 400 + 50 + 7 \\ \hline 500 \end{array}$ <p>2 ones subtract seven ones is not possible.</p> <p>We must..... exchange 1 ten for 10 ones.</p> $\begin{array}{r} 982 \\ - 457 \\ \hline \end{array}$ <p>12 ones subtract 7 ones is 5 ones.</p> $\begin{array}{r} 982 \\ - 457 \\ \hline 525 \end{array}$

Objective	Concrete	Pictorial	Abstract
Subtract numbers of increasing complexity.		<p>31056 - 2128</p> 	<p>6 ones subtract 8 ones is not possible. Exchange 1 ten for 10 ones.</p> $\begin{array}{r} 31056 \\ - 2128 \\ \hline \end{array}$
			<p>16 ones subtract 8 ones equals 8 ones.</p> $\begin{array}{r} 310\overset{4}{5}6 \\ - 2128 \\ \hline \end{array}$
			<p>4 tens subtract 2 tens equals 2 tens.</p> $\begin{array}{r} 310\overset{4}{5}6 \\ - 2128 \\ \hline \end{array}$
			<p>Exchange 1 thousand for 10 hundreds.</p> $\begin{array}{r} 310\overset{4}{5}6 \\ - 2128 \\ \hline 8 \end{array}$
			<p>10 hundreds subtract 1 hundred equals 9 hundreds.</p> $\begin{array}{r} 310\overset{4}{5}6 \\ - 2128 \\ \hline 28 \end{array}$
			<p>Exchange 1 ten-thousand for 10 thousands.</p> $\begin{array}{r} 310\overset{0}{5}6 \\ - 2128 \\ \hline 28 \end{array}$
			<p>10 thousands subtract 2 thousands is 8 thousands.</p> $\begin{array}{r} 310\overset{2}{5}6 \\ - 2128 \\ \hline 8928 \end{array}$
			<p>2 ten-thousands subtract zero equals 2 ten-thousands.</p> $\begin{array}{r} 310\overset{2}{5}6 \\ - 2128 \\ \hline 8928 \end{array}$

Objective	Concrete	Pictorial	Abstract
Subtract numbers of increasing complexity		<p>354.27 - 247.32</p>  	<p>Line up decimal points.</p> $\begin{array}{r} 354.27 \\ - 247.32 \\ \hline 106.95 \end{array}$ <p>Insert zero for place holders to avoid place value mistakes.</p> $\begin{array}{r} 354.27 \\ - 247.32 \\ \hline 106.95 \end{array}$

Key Stage	Key Vocabulary
KS1	Equal to, take away, less, minus, subtract, difference between, how many more, how many fewer/less than, most, least, count back, how many left, count on, partition, tens, units, digit
LKS2	Equal to, take, take away, less, minus, subtract, leaves, distance between, difference between, how many more, how many fewer/less than, most, least, count back, how many left, how much less is_?, count on, strategy, partition, tens, units, exchange, decrease, hundreds, value, digit, inverse., subtrahend, minuend,
UKS2	Equal to, take, take away, less, minus, subtract, leaves, distance between, difference between, how many more, how many fewer/less than, most, least, count back, how many left, how much less is_?, count on, strategy, partition, tens, units, exchange, decrease, hundreds, value, digit, inverse, tenths, hundredths, decimal place, decimal ,subtrahend, minuend,

Mental Strategies for Multiplication and Division

Times table facts and related times table facts $7 \times 3 = 21$ $70 \times 30 = 210$ $0.7 \times 3 = 2.1$	Repeated addition for multiplication $7 \times 3 =$ $7 + 7 + 7 = 21$	Repeated subtraction for division $21 \div 7 = 3$ $21 - 7 - 7 - 7$
Commutative law of multiplication 7×3 is equivalent to 3×7	Using the inverse $3 \times 7 = 21$ $21 \div 7 = 3$ $21 \div 3 = 7$	Partitioning one number $7 \times 23 =$ $7 \times 20 + 7 \times 3 =$ $140 + 21 = 161$
Doubling 93×4 is double 93 add double 93 Halving $448 \div 4$ is half 448 and half again	Place value knowledge $21 \times 12 = 252$ $21 \times 1.2 = 25.2$ $0.21 \times 12 = 2.52$ $25.2 \div 12 = 2.1$	Using a known tables and adjusting/adding/subtracting $14 \times 7 =$ $12 \times 7 = 84$ $2 \times 7 = 14$ $84 + 14 = 98$ $18 \times 16 = 288$ $19 \times 16 = 288 + 16 = 304$
Using place value and multiplication/division facts $189 \div 9$ $180 \div 9 = 20$ $9 \div 9 = 1$ $20 + 1 = 21$	Divisibility rules e.g numbers that are wholly divisible by 3 have a digit sum of 3, 6 or 9. $567 \div 3$ $5 + 6 + 7 = 18$ $1 + 8 = 9$ 597 is wholly divisible by 3.	

Glossary

Array – An ordered collection of counters, cubes or other item in rows and columns.

Commutative – Numbers can be multiplied in any order.

Dividend – In division, the number that is divided.

Divisor – In division, the number by which another is divided.

Exchange – Change a number or expression for another of an equal value.

Factor – A number that multiplies with another to make a product.

Multiplicand – In multiplication, a number to be multiplied by another.

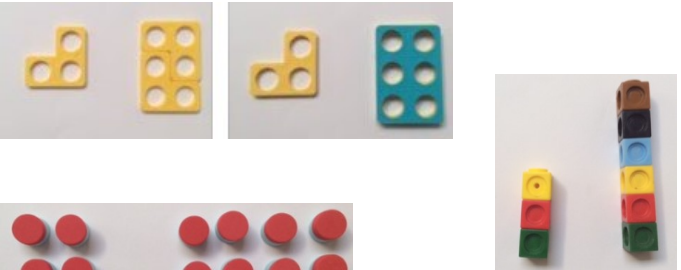
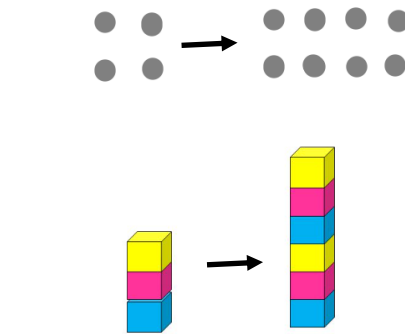
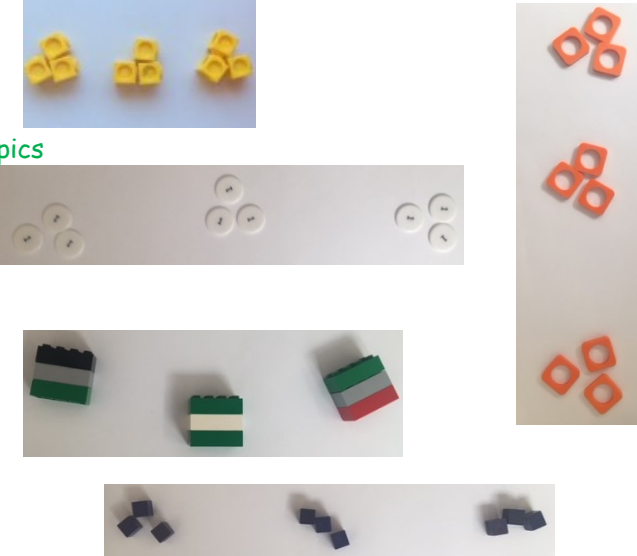
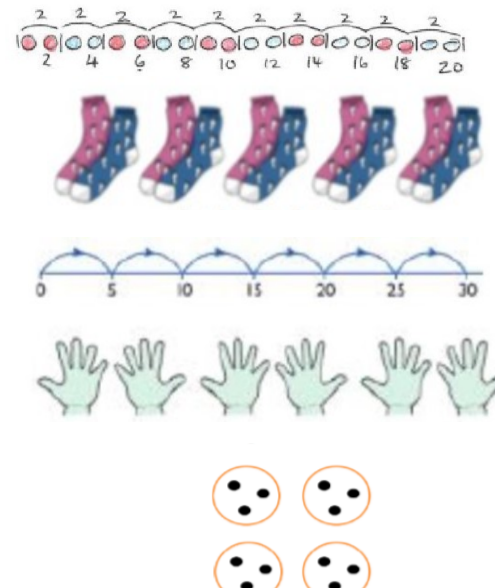
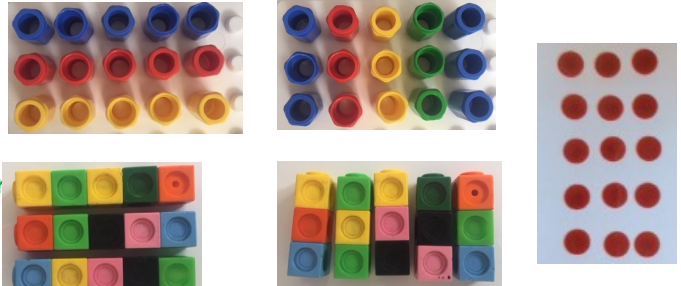
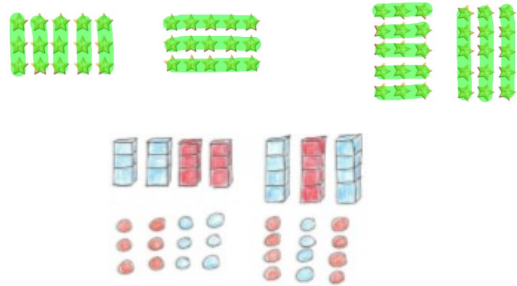
Partitioning – Splitting a number into its component parts.

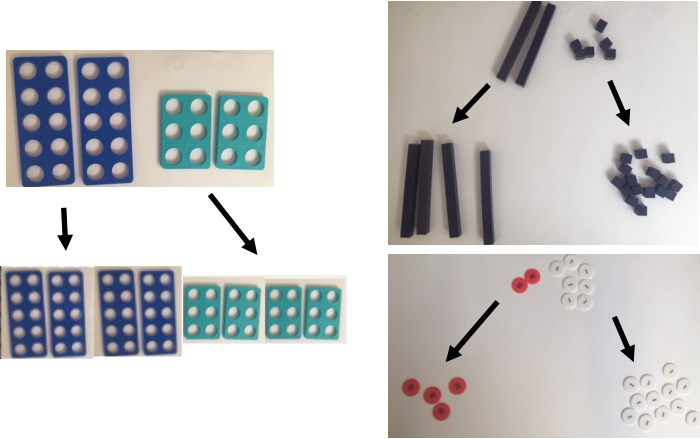
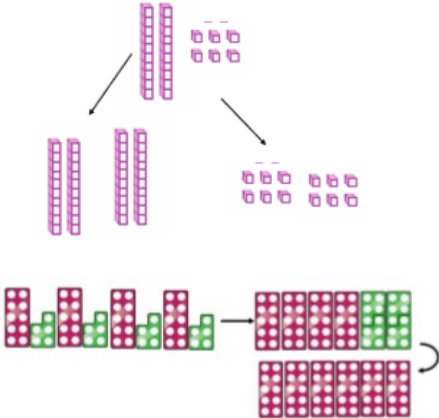

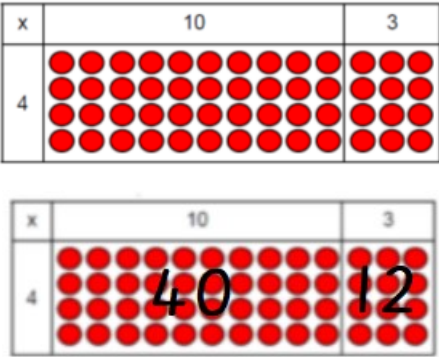
Product – The result of multiplying one number by another.

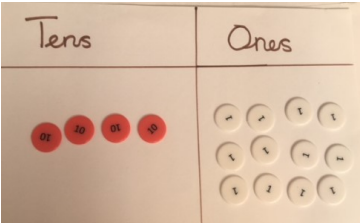
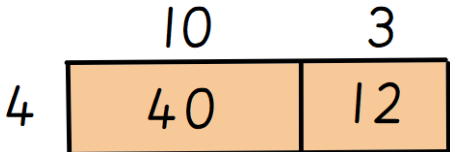
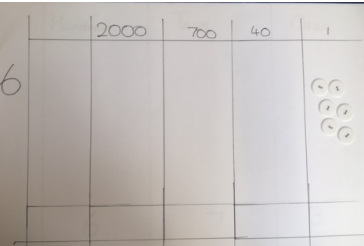
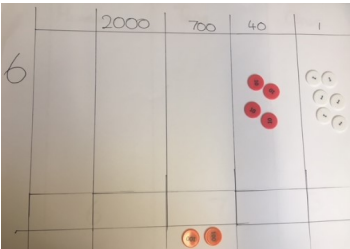

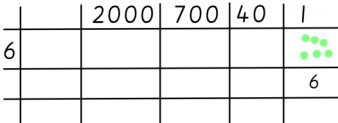
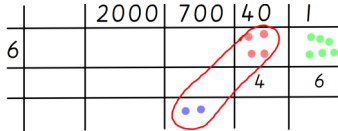

Quotient – The result of a division

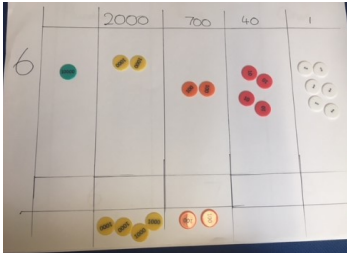
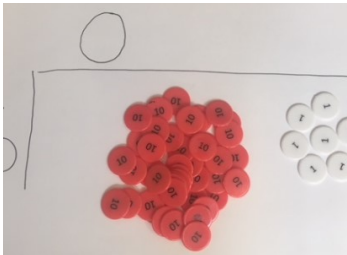

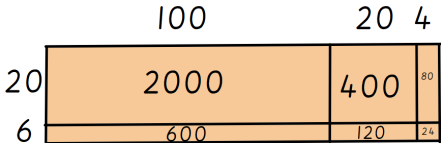
Remainder – The amount left over after a division when the divisor is not a factor of the dividend.

Scaling – Enlarging or reducing a number by a given amount, called the scale factor

Objective	Concrete	Pictorial	Abstract								
Doubling			<p>Double 4 is 8</p> $4 + 4 = 8$ $2 \times 4 = 8$ <p>Double 3 is 6</p> $3 + 3 = 6$ $2 \times 3 = 6$								
Counting in multiples (Repeated Addition)			<p>Count in multiples of a number aloud.</p> $2 + 2 + 2 + 2 + 2 = 10$ <p>Write sequences with multiples of numbers.</p> <p>0, 2, 4, 6, 8, 10, 12 0, 5, 10, 15, 20, 25, 30</p> $4 \times 3 = 12$ <table border="1" data-bbox="1868 975 2130 1094"> <tr> <td>3</td><td>3</td><td>3</td><td>3</td></tr> <tr> <td colspan="4">?</td></tr> </table>	3	3	3	3	?			
3	3	3	3								
?											
Using arrays/commutativity			$3 + 3 + 3 + 3 + 3 = 15$ $5 + 5 + 5 = 15$ $5 \times 3 = 15$ $3 \times 5 = 15$ $3 \times 5 = 5 \times 3$								

Objective	Concrete	Pictorial	Abstract
Partition to multiply			$\begin{array}{r} 26 \\ 20 \quad 6 \\ \times 2 \quad \times 2 \\ \hline 40 \quad 12 \end{array}$ $4 \times 15 = 4 \times 10 + 4 \times 5 =$ $40 + 20 = 60$
Grid Method		 $\begin{array}{r l l} x & 10 & 3 \\ \hline 4 & 40 & 12 \end{array}$ $40 + 12 = 52$	$\begin{array}{r l l} x & 10 & 3 \\ \hline 4 & 40 & 12 \\ \hline & 40 + 12 = 52 & \end{array}$

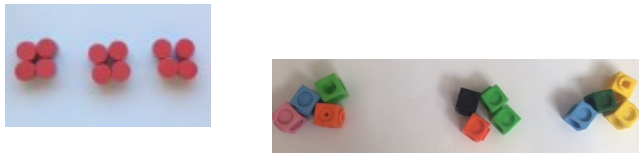
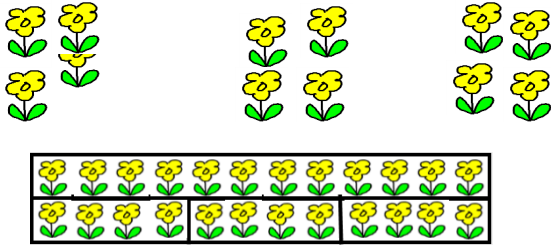
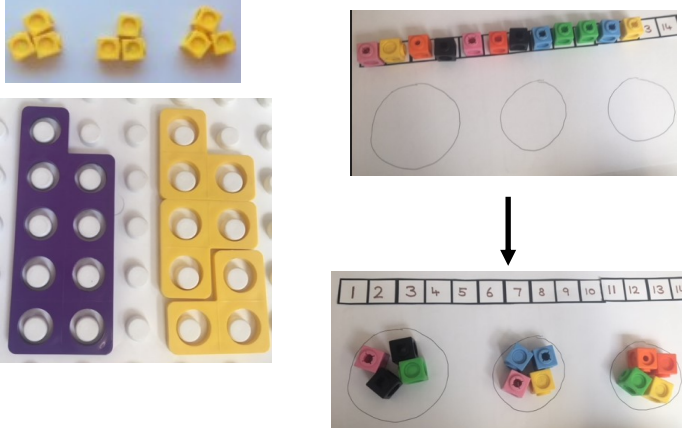
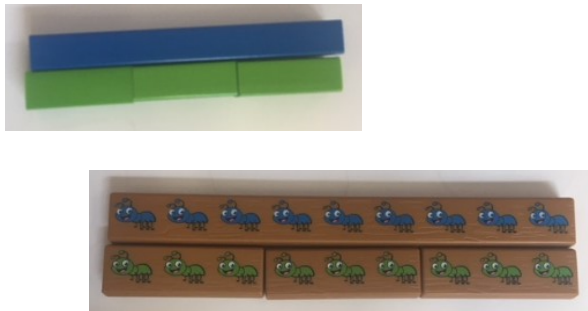
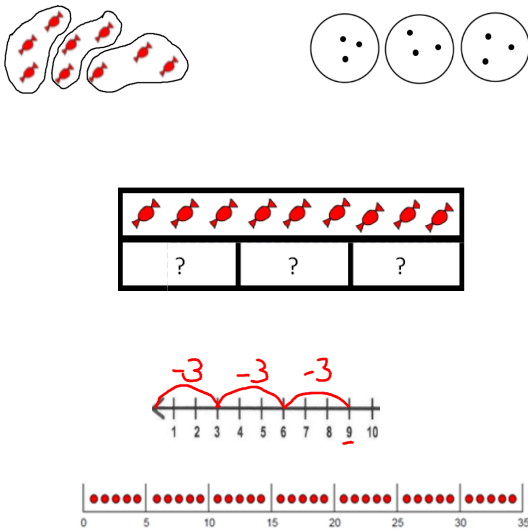
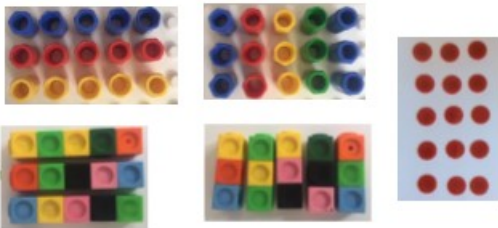

Objective	Concrete	Pictorial	Abstract
Short Multiplication - Expanded Method			<p>Expanded with notation.</p> $\begin{array}{r} 13 \\ \times 4 \\ \hline 12 \leftarrow 4 \times 3 \\ 40 \leftarrow 4 \times 10 \\ \hline 52 \end{array}$ <p>Expanded without notation.</p> $\begin{array}{r} 13 \\ \times 4 \\ \hline 12 \\ 40 \\ \hline 52 \end{array}$
Short Multiplication - Compact	  	  	<p>6 multiplied by 1 is 6. Write a 6 in the ones column of the answer.</p> $\begin{array}{r} 274 \\ \times 6 \\ \hline 6 \end{array}$ <p>6 multiplied by 40 is 240. Write the 4 into the tens column. We cannot write the 2 in the hundreds column yet as there may be more to come. Write the 2 underneath the calculation in the hundreds column.</p> $\begin{array}{r} 274 \\ \times 6 \\ \hline 46 \end{array}$ <p>6 multiplied by 700 is 4200. We have 2 hundreds from 4200 and 2 hundreds from 6 x 4 = 240. We have 4 hundreds altogether. We cannot write the 4 in the thousands column yet as there may be more to come. Write the 4 underneath the calculation in the thousands column.</p> $\begin{array}{r} 274 \\ \times 6 \\ \hline 446 \end{array}$

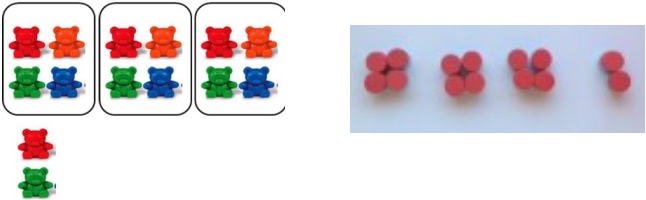
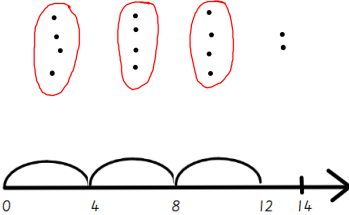
Objective	Concrete	Pictorial	Abstract
	 		<p>6 multiplied by 2000 is 12000. We have 2 thousands from 12000 and 4 thousands from $6 \times 700 = 4200$. We have 6 thousands altogether.</p> $\begin{array}{r} 2741 \\ \times 6 \\ \hline 16446 \end{array}$ <p>Finally, as there are no more numbers to multiply, we can write the 1 from $2 \times 200 = 12000$ in the ten thousands column.</p> $\begin{array}{r} 2741 \\ \times 6 \\ \hline 16446 \end{array}$
Long Multiplication - Expanded			$\begin{array}{r} 124 \\ \times 26 \\ \hline 24 \leftarrow 6 \times 40 \\ 120 \leftarrow 6 \times 20 \\ 600 \leftarrow 6 \times 100 \\ 80 \leftarrow 20 \times 4 \\ 400 \leftarrow 20 \times 20 \\ 2000 \leftarrow 20 \times 100 \\ \hline 3224 \end{array}$ <p>Expanded with notation.</p> $\begin{array}{r} 124 \\ \times 26 \\ \hline 24 \\ 120 \\ 600 \\ 80 \\ 400 \\ 2000 \\ \hline 3224 \end{array}$ <p>Expanded without notation.</p>

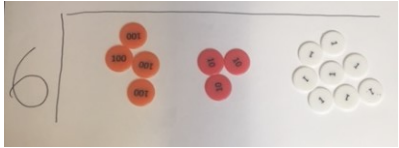
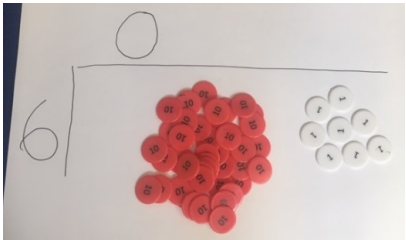
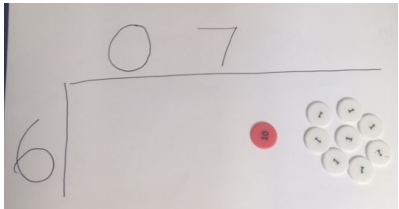
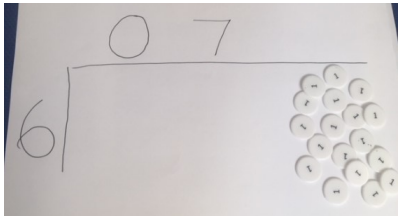
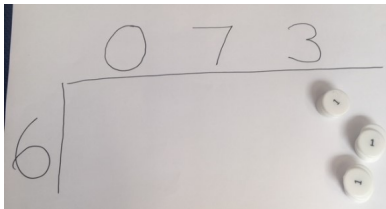
Objective	Concrete	Pictorial	Abstract
Long Multi- plication - Compact			<p>124 x 26</p> <p>To do compact long multiplication we essentially do compact short multiplication twice: 6 x 124 and then 20 x 124.</p> <p>6 x 4 is 24. Write a 4 in the ones column of the answer. We cannot write the 2 in the tens column yet as there may be more to come. Write the 2 underneath this sub-answer in the tens column.</p> $\begin{array}{r} 124 \\ \times 26 \\ \hline \end{array}$ <p>6 x 20 is 120 We have 2 tens from 120 and 2 tens from 6 x 4 = 24 We have 4 tens in total. Write the 4 in the tens column. We cannot write the 1 in the hundreds column yet as there may be more to come. Write the 1 underneath the sub-answer in the hundreds column.</p> $\begin{array}{r} 124 \\ \times 26 \\ \hline 44 \\ 1240 \\ \hline \end{array}$ <p>6 x 100 is 600 We have 6 hundreds from 600 and 1 hundred from 6 x 20 = 120. We have 7 hundreds in total. Write the 7 in the hundreds column.</p> $\begin{array}{r} 124 \\ \times 26 \\ \hline 44 \\ 1240 \\ 7440 \\ \hline \end{array}$

Objective	Concrete	Pictorial	Abstract
Long Multi- plication - Compact			<p>20 x 4 is 80. Write the 0 in the ones column and the 8 in the tens column.</p> $\begin{array}{r} 124 \\ \times 26 \\ \hline 744 \\ 80 \\ \hline \end{array}$ <p>20 x 2 is 400. Write the 4 in the hundreds column. 20 x 100 is 2000. Write the 2 in the thousands column.</p> $\begin{array}{r} 124 \\ \times 26 \\ \hline 744 \\ 80 \\ \hline 2480 \end{array}$ <p>Finally add both answers together using column addition.</p> $\begin{array}{r} 124 \\ \times 26 \\ \hline 744 \\ 80 \\ \hline 2480 \\ \hline 3224 \\ \hline \end{array}$

Key Stage	Key Vocabulary
KS1	Groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, tens, units, value
LKS2	Groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, times as big as, once, twice, three times, partition, grid method, multiple, product, tens, units, value, inverse, multiplicand, scaling
UKS2	Groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, times as big as, once, twice, three times, partition, grid method, multiple, product, tens, units, value, inverse, square, factor, integer, decimal, short/long multiplication, exchange, multiplicand, scaling

Objective	Concrete	Pictorial	Abstract						
Division as sharing			12 shared between 3 is 4 $12 \div 3 = 4$ <table border="1" data-bbox="1650 242 2060 317"><tr><td colspan="3">12</td></tr><tr><td>4</td><td>4</td><td>4</td></tr></table> ke?	12			4	4	4
12									
4	4	4							
Division as grouping	 		$9 \div 3 = 3$ <table border="1" data-bbox="1635 502 1975 611"><tr><td colspan="3">9</td></tr><tr><td>?</td><td>?</td><td>?</td></tr></table> How many are in each group?	9			?	?	?
9									
?	?	?							
Division with arrays - Link to inverse			$15 \div 3 = 5$ $15 \div 5 = 3$						

Objective	Concrete	Pictorial	Abstract
Division with remainders			$14 \div 4 = 3 \text{ r}2$

Objective	Concrete	Pictorial	Abstract
Short division	    		<p>Begin with division with no remainders.</p> <p>$438 \div 6$</p> $\begin{array}{r} 6 \overline{) 438} \\ 0 \\ \hline 6 \overline{) 438} \end{array}$ <p>We must start with the hundreds. This number has 4 (hundreds). 4 (hundreds) divided by 6 is 0. Write 0 in the hundreds column.</p> <p>Now we must exchange the 4 (hundreds) for tens. In total we now have 43 tens. 43 (tens) divided by 6 is 7 (tens) with 1 ten remaining. Write the 7 in the tens column.</p> <p>Exchange the 1 left over ten for 10 ones. We now have 18 ones. 18 (ones) divided by 6 is 3. Write the 3 in the ones column.</p> $\begin{array}{r} 073 \\ 6 \overline{) 438} \end{array}$ <p>Move on to division with remainders</p> <p>Finally move on to division with decimal places to divide the total accurately.</p> $\begin{array}{r} 086 \text{ r}2 \\ 5 \overline{) 432} \end{array}$ $\begin{array}{r} 020.5 \\ 6 \overline{) 123.0} \end{array}$

Objective	Concrete	Pictorial	Abstract
Long division			<p>$432 \div 15 =$</p> <p>We must start with the hundreds number.</p> $15 \overline{)432}$ <p>4 (hundreds) divided by 15 is 0. Write 0 in the hundreds column.</p> $15 \overline{)432}$ <p>Now we must exchange 4 hundreds for tens. In total we now have 43 (tens). 43 (tens) divided by 15 is 2 (tens).</p> $15 \overline{)432}$ <p>Write 2 in the tens column. 2 (tens) multiplied by 15 is 30. Write 30 underneath 43.</p> $15 \overline{)432}$ <p>43 subtract 30 is 13.</p> $15 \overline{)432}$ <p>Bring down the 2. In total we now have 132 (ones).</p> $15 \overline{)432}$ $15 \overline{)432}$ $15 \overline{)432}$

Objective	Concrete	Pictorial	Abstract
Long division			<p>132 (ones) divided by 15 is 8. Write 8 in the ones column.</p> $\begin{array}{r} 028 \\ 15 \overline{)432} \\ \underline{-30} \\ 132 \end{array}$ <p>8 (ones) multiplied by 15 is 120 (ones). Write 120 underneath 132.</p> $\begin{array}{r} 028 \\ 15 \overline{)432} \\ \underline{-30} \\ 132 \\ \underline{-120} \\ 12 \end{array}$ <p>132 subtract 120 is 12.</p> <p>12 is the remainder.</p> $\begin{array}{r} 028r12 \\ 15 \overline{)432} \\ \underline{-30} \\ 132 \\ \underline{-120} \\ 12 \end{array}$

Key Stage	Key Vocabulary
KS1	Share, share equally, one each, two each..., group, groups of, lots of, array, divide, divided by, divided into, division, grouping, number line
LKS2	Share, share equally, one each, two each..., group, groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, carry, remainder, multiple, divisible by, factor, scaling, quotient, dividend, divisor
UKS2	Share, share equally, one each, two each..., group, groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, carry, remainder, multiple, divisible by, factor, quotient, prime number, prime factors, composite number (non-prime), common factor, scaling, quotient, dividend, divisor