NEWBOROUGH CHURCH OF ENGLAND PRIMARY SCHOOL

Calculation Policy

Reviewed: Summer 2022

Next Review: Summer 2023

Introduction

Introduction:

This calculation policy has been written in line with the programmes of study taken from the revised National Curriculum for Mathematics (2014). It provides guidance on appropriate calculation methods and progression. The content is set out in year group blocks (guidance only) under the following headings: addition, subtraction, multiplication and division.

Aims of the Policy:

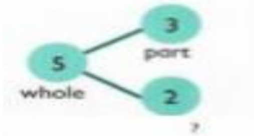
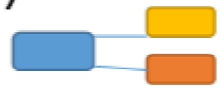
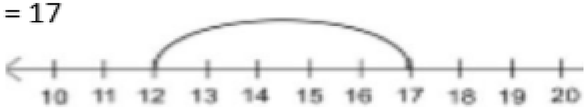
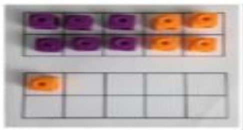
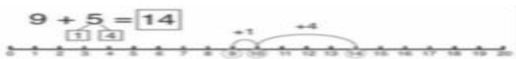
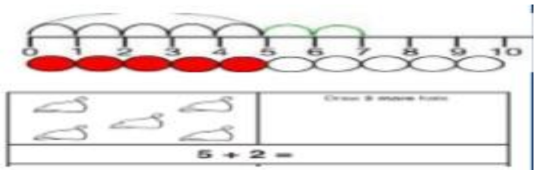
• To ensure consistency and progression in our approach to calculation
• To ensure that children develop an efficient, reliable, formal written method of calculation for all operations
• To ensure that children can use these methods accurately with confidence and understanding

How to Use This Policy:

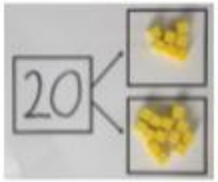
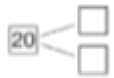
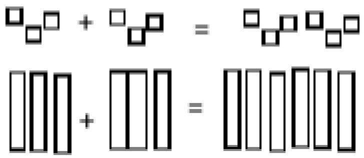
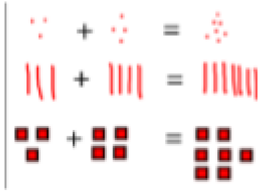
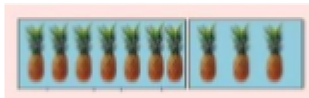
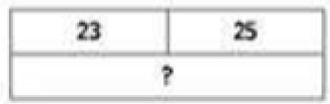
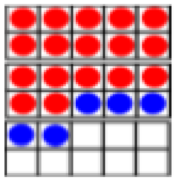
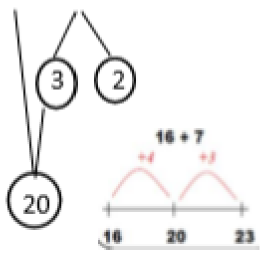
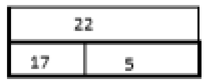
• Use the policy as the basis of your planning but ensure you use previous or following stages' guidance to allow for personalised learning
• Always use assessment for learning to identify suitable next steps in calculation for groups of children
• If, at any time, children are making significant errors, return to the previous stage in calculation
• Always use suitable resources, models and images to support children's understanding of calculation and place value, as appropriate
• Encourage children to make sensible choices about the methods they use when solving problems

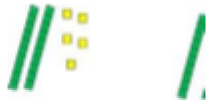
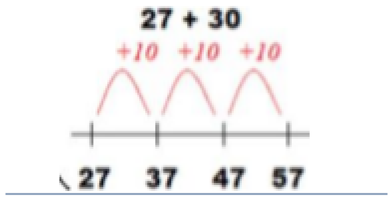
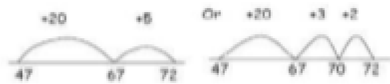
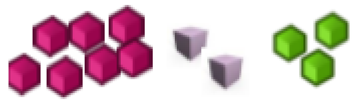
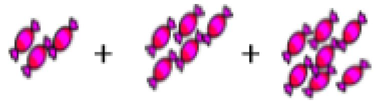
Representations:

The key to successful implementation of a school calculation policy is the consistent use of representations (model and images that support conceptual understanding of the mathematics) and this policy promotes a range of relevant representations, across the primary years. Mathematical understanding is developed through use of representations that are first concrete (e.g. Dienes apparatus, cubes), and then pictorial (e.g. array, place value counters) to then facilitate abstract working (e.g. column addition, long multiplication). This policy guides teachers through an appropriate progression of representations, and if at any point a pupil is struggling they should revert to familiar pictorial and/or concrete materials/ representations as appropriate. Whilst a mathematically fluent child will be able to choose the most appropriate representation and procedure to carry out a calculation, whether written or mental, teachers should support pupils with carefully selected representations that underpin calculation methods (as detailed in this policy), and ensure there is consistency across year groups.

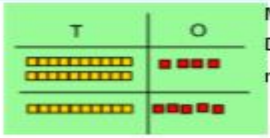
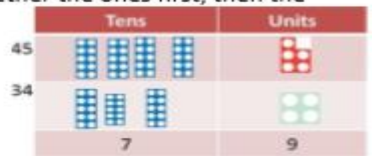
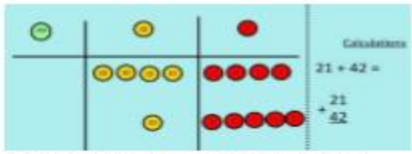
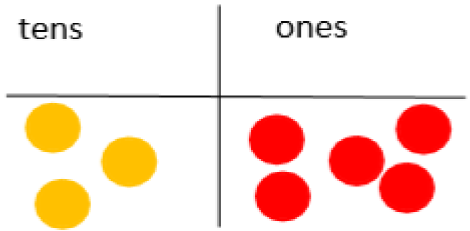
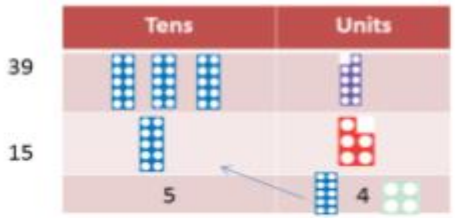
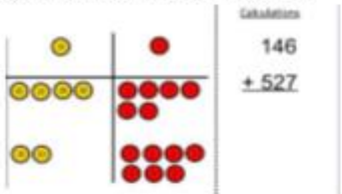
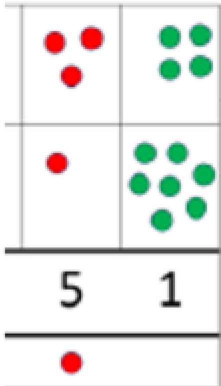
EYFS/ Year 1 – Addition			
Objective and Strategy	**Concrete**	**Pictorial**	**Abstract**
Combing to parts to make a whole: part – whole model	   Use part part whole model. Use cubes to add two numbers together as a group or in a bar. 	   Use pictures to add two numbers together as a group or in a bar.	4 + 3 = 7  10= 6 + 4 Use the part-part whole diagram as shown above to move into the abstract.
Starting at the biggest number and counting on	 Start with the larger number on the bead string and then count on to the smaller number 1 by 1 to find the answer.	12 + 5 = 17  Start at the larger number on the number line and count on in ones or in one jump to find the answer.	5 + 12 = 17 Place the larger number in your head and count on the smaller number to find your answer.
Regrouping to make 10 *This is an essential skill for column addition later*	 6 + 5 = 11  Start with the bigger number and use the smaller number to make 10. Use ten frames.	 3 + 9 = Use pictures or a number line. Regroup or partition the smaller number using the part part whole model to make 10. 	7 + 4= 11 If I am at seven, how many more do I need to make 10. How many more do I add on now?
Represent & use number bonds and related subtraction facts within 20	 2 more than 5.		Emphasis should be on the language *'1 more than 5 is equal to 6.'* *'2 more than 5 is 7.'* *'8 is 3 more than 5.'*

Year 2 - Addition

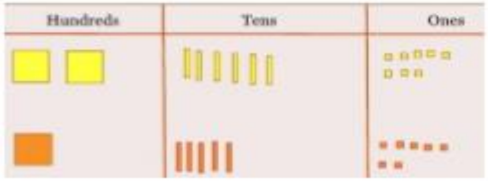
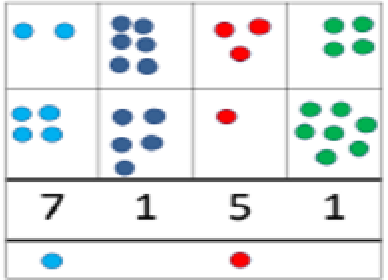
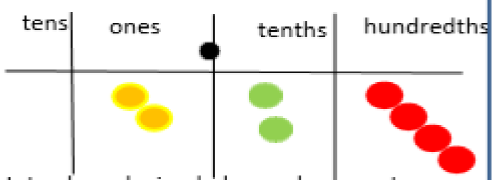
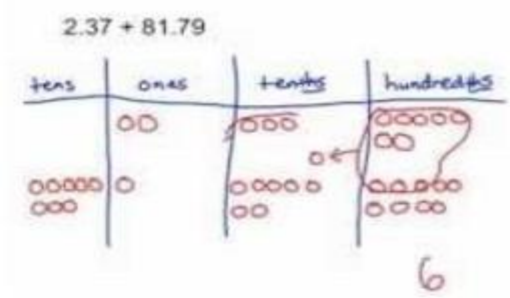
Objective and Strategy	Concrete	Pictorial	Abstract
Adding multiples of ten	50= 30 = 20  Model using dienes and bead strings	 Use representations for base ten.	20 + 30 = 50 70 = 50 + 20 40 + □ = 60
Use known number facts Part-part whole	 Children explore ways of making numbers within 20	 □ + □ = 20 20 − □ = □ □ + □ = 20 20 − □ = □	□ + 1 = 16 16 − 1 = □ 1 + □ = 16 16 − □ = 1
Using known facts		 Children draw representations of H,T and O	3 + 4 = 7 *leads to* 30 + 40 = 70 *leads to* 300 + 400 = 700
Bar model	 3 + 4 = 7	 7 + 3 = 10	 23 + 25 = 48
Add a two-digit number and ones	 17 + 5 = 22 Use ten frame to make 'magic ten Children explore the pattern. 17 + 5 = 22 27 + 5 = 32	17 + 5 = 22 Use part part whole and number line to model. 	17 + 5 = 22 Explore related facts 17 + 5 = 22 5 + 17 = 22 22—17 = 5 22—5 = 17 

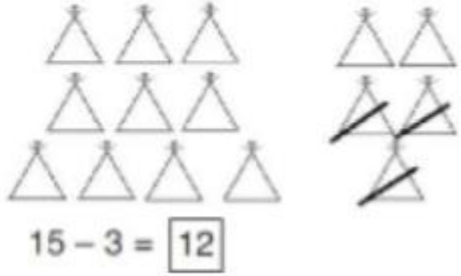
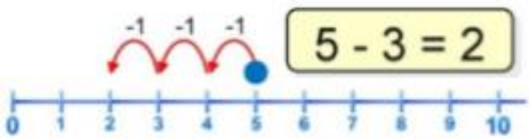
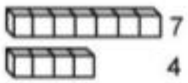
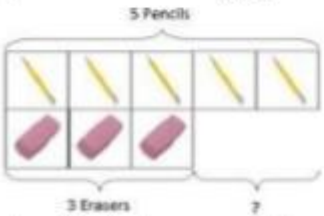
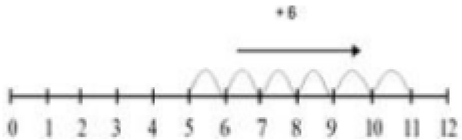
Add a 2 digit number and tens	 25 + 10 = 35 Explore that the ones digit does not change	 	27 + 10 = 37 27 + 20 = 47 27 + □ = 57
Add two 2-digit numbers	 Model using dienes , place value counters and numicon	 Use number line and bridge ten using part whole if necessary.	25 + 47 20 + 5 40 + 7 20 + 40 = 60 5+ 7 =12 60 + 12 = 72
Add three 1-digit numbers	 Combine to make 10 first if possible, or bridge 1o then add third digit	 Regroup and draw representation.  = 15	4 + 7 + 6 = $\boxed{10}$ + $\boxed{7}$ 10 = $\boxed{17}$ Combine the two numbers that make/ bridge ten then add on the third.

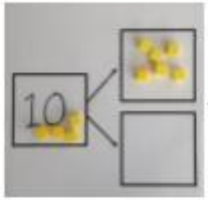
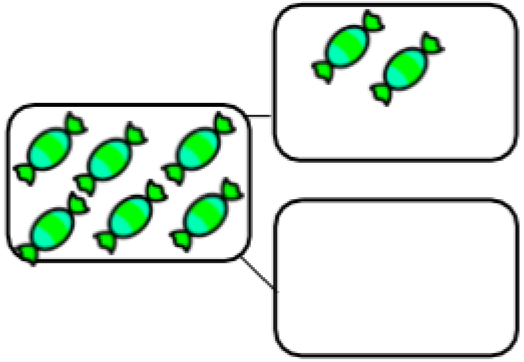
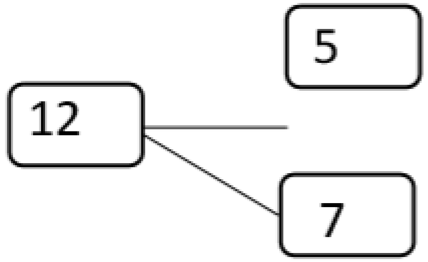
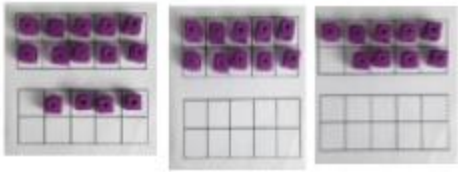
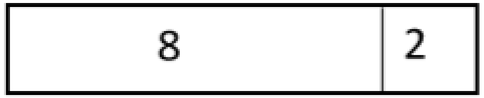
Year 3 - Addition

Objective and Strategy	Concrete	Pictorial	Abstract
Column Addition—no regrouping Add two or three 2 or 3- digit numbers	 Model using Dienes or numicon Add together the ones first, then the tens.   Move to using place value counters	Children move to drawing the counters using a tens and one frame.  	$$\begin{array}{r} 2\ 2\ 3 \\ +\ 1\ 1\ 4 \\ 3\ 3\ 7 \end{array}$$ Add the ones first, then the tens, then the hundreds.
Column addition with regrouping	 Exchange ten ones for a ten. Model using numicon and pv counters.  	 Children can draw a representation of the grid to further support their understanding, carrying the ten **underneath** the line	$$\begin{array}{cccccc} 20 & + & 5 & & \\ 40 & + & 8 & & \\ \hline 60 & + & 13 & = & 73 \end{array}$$ Start by partitioning the numbers before formal column to show the exchange. $$\begin{array}{r} 536 \\ +\ 85 \\ \hline 621 \\ \hline 1\ 1\ \ \end{array}$$

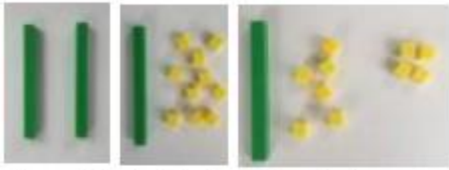
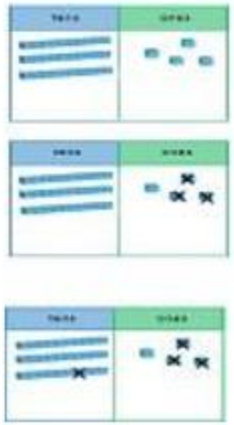
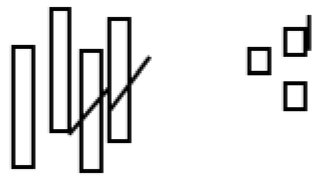
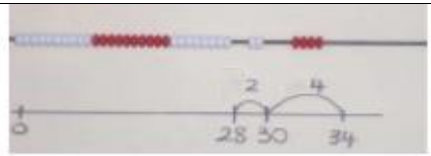
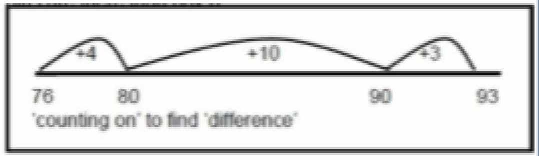
Years 4, 5 and 6 - Addition

Objective and Strategy	Concrete	Pictorial	Abstract
Y4—Add numbers with up to 4 digits	Children continue to use dienes or pv counters to add, exchanging ten ones for a ten and ten tens for a hundred and ten hundreds for a thousand.  	 Draw representations using pv grid.	Continue from previous work to carry hundreds as well as tens. Relate to money and measures.
Y5 – Add numbers with more than 4 digits Add decimals to two decimal places, including money	As year 4  Introduce decimal place value counters and model exchange for addition.	 	72.8 + 54.6 127.4 1 1 £ 2 3 . 5 9 + £ 7 . 5 5 £ 3 1 . 1 4
Y6—Add several numbers of increasing complexity Including adding money, measure and decimals with different numbers of decimal points	As Y5	As Y5	8 1,0 5 9 3,6 6 8 1 5,3 0 1 + 2 0,5 5 1 1 2 0,5 7 9 1 1 1 1 Insert zeros for place holders. 2 3 . 3 6 1 9 . 0 8 0 5 9 . 7 7 0 + 1 . 3 0 0 9 3 . 5 1 1 2 1 2

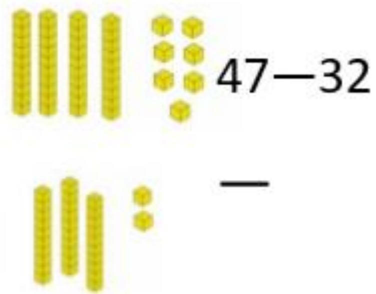
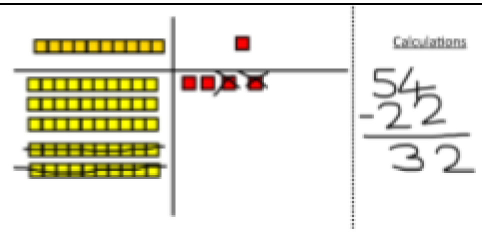
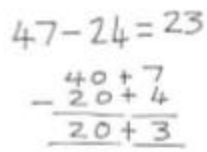
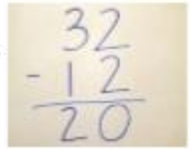
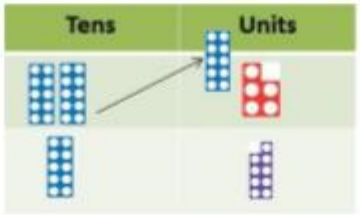
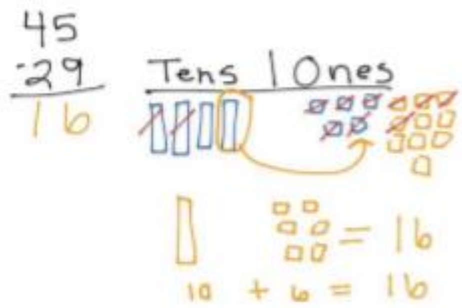
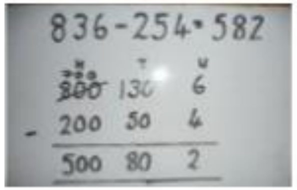
EYFS/Year 1 - Subtraction			
Objective and Strategy	**Concrete**	**Pictorial**	**Abstract**
Taking away ones	Use physical objects, counters, cubes etc to show how objects can be taken away.  6—4 = 2  4—2 = 2	 Cross out drawn objects to show what has been taken away.	7—4 = 3 16—9 = 7
Counting back	 Move objects away from the group, counting backwards.  Move the beads along the bead string as you count backwards.	 Count back in ones using a number line.	Put 13 in your head, count back 4. What number are you at?
Find the difference	Compare objects and amounts  'Seven is 3 more than four' 'I am 2 years older than my sister'  Lay objects to represent bar model.	Count on using a number line to find the difference.  	Hannah has 12 sweets and her sister has 5. How many more does Hannah have than her sister.?

Represent and use number bonds and related subtraction facts within 20 Part-Part Whole model	 Link to addition. Use PPW model to model the inverse. If 10 is the whole and 6 is one of the arts, what s the other part? 10—6 = 4	 Use pictorial representations to show the part.	Move to using numbers within the part whole model. 
Make 10	14—9  Make 14 on the ten frame. Take 4 away to make ten, then take one more away so that you have taken 5.	13—7  Jump back 3 first, then another 4. Use ten as the stopping point.	16—8 How many do we take off first to get to 10? How many left to take off?
Bar model	 5—2 = 3		 10 = 8 + 2 10 = 2 + 8 10—2 = 8 10—8 = 2

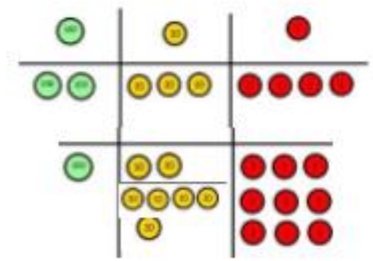
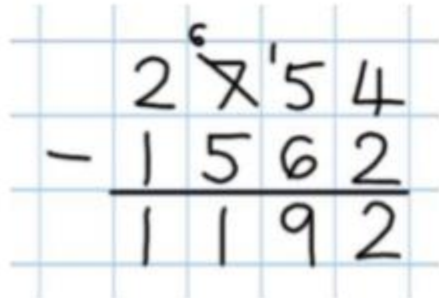
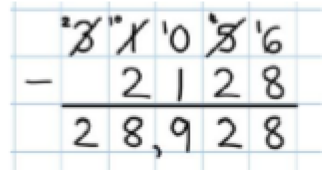
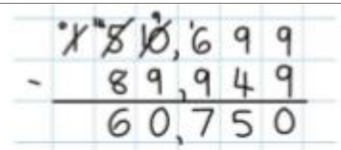
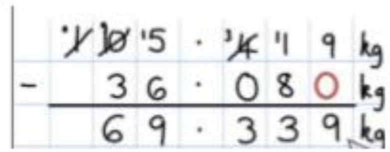
Year 2 - Subtraction

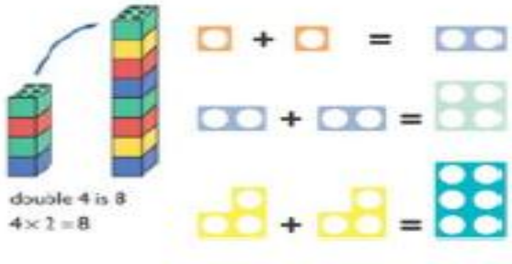
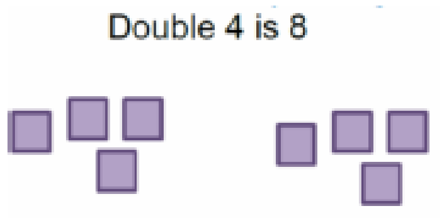
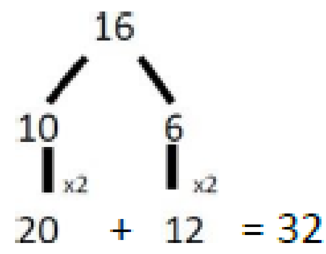
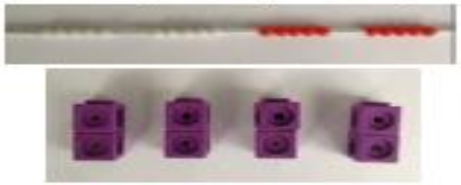
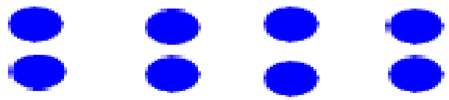
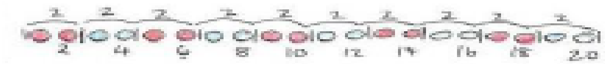
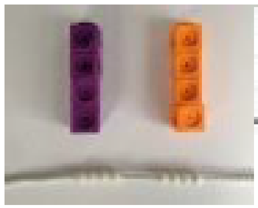
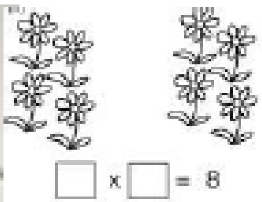
Objective and Strategy	**Concrete**	**Pictorial**	**Abstract**
Regroup a ten into ten ones	 Use a PV chart to show how to change a ten into ten ones, use the term 'take and make'		20—4 = 16
Partitioning to sub- tract without re- grouping	34—13 = 21  Use Dienes to show how to par- tition the number when subtracting without regroup- ing.	Children draw representations of Dienes and cross off.  43—21 = 22	43—21 = 22
Make ten strategy *Progression should be crossing one ten, crossing more than one ten, crossing the hundreds.*	 34—28 Use a bead bar or bead strings to model counting to next ten and the rest.	 Use a number line to count on to next ten and then the rest.	93—76 = 17

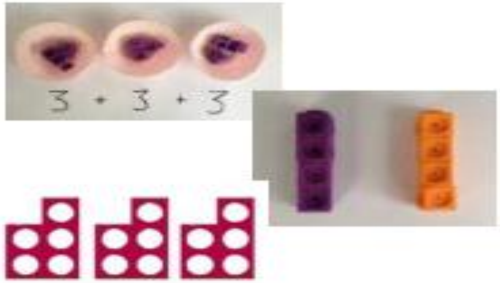
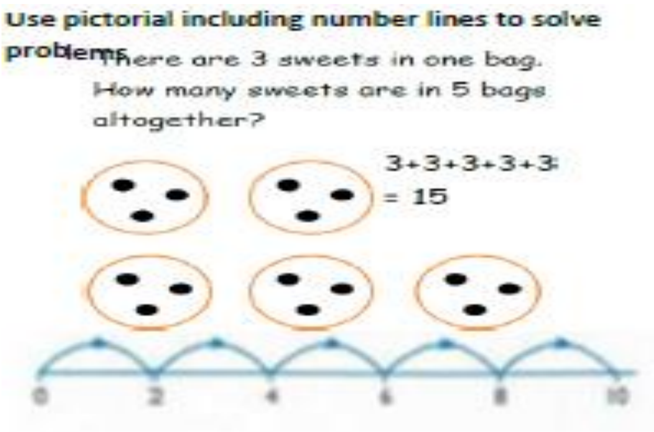
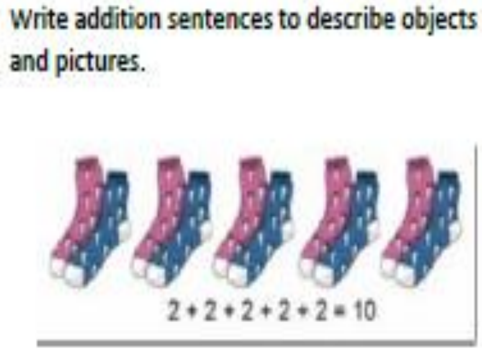
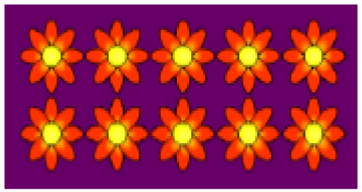
Year 3 – Subtraction

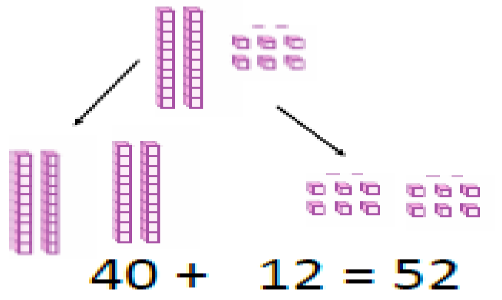
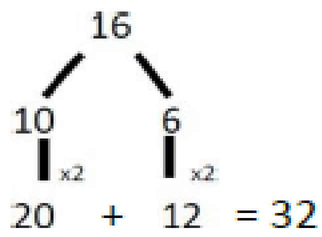
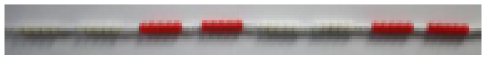
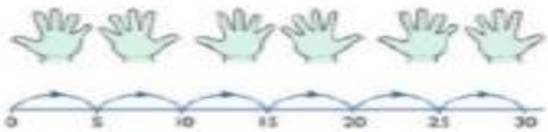
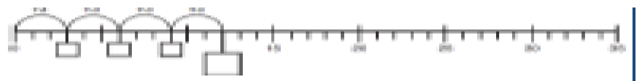
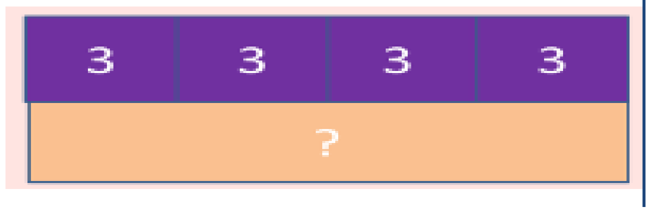
Objective and Strategy	Concrete	Pictorial	Abstract
Column subtraction without regrouping	 Use base 10 or Numicon to model	 Draw representations to support under-standing	 Intermediate step may be needed to lead to clear subtraction under-standing. 
Column subtraction with regrouping	 Begin with base 10 or Numicon. Move to pv counters, modelling the exchange of a ten into ten ones. Use the phrase 'take and make' for exchange.	 Children may draw base ten or PV counters and cross off.	 Begin by partitioning into pv columns  Then move to formal method.

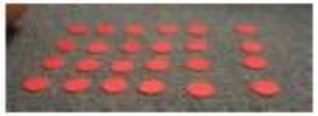
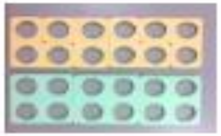
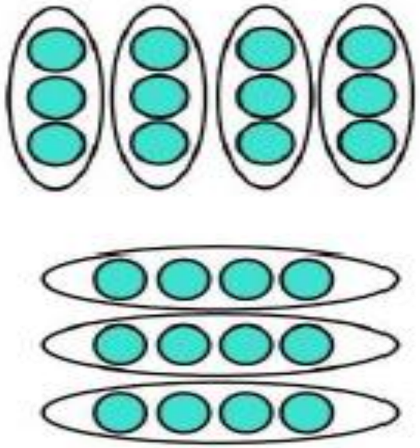
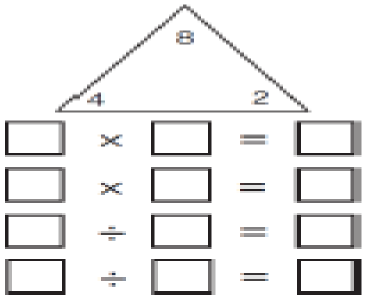
Years 4, 5 and 6 - Subtraction

Objective and Strategy	**Concrete**	**Pictorial**	**Abstract**
Y4 – Subtract with up to four digits	234 - 179  Model process of exchange using Numicon, base ten and then move to PV counters.	Children to draw pv counters and show their exchange – see Y3	 Use the phrase 'take and make' for exchange
Y5 – Subtract with at least four digits, including money	As Year 4	Children to draw pv counters and show their exchange—see Y3	 Use zeros for place-holders.
Y6 - Subtract with increasingly large and more complex numbers and decimal values			 

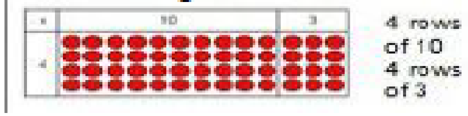
EYFS/ Year 1 – Multiplication			
Objective and Strategy	**Concrete**	**Pictorial**	**Abstract**
Doubling	Use practical activities using manipultives including cubes and Numicon to demonstrate doubling 	Draw pictures to show how to double numbers 	Partition a number and then double each part before recombining it back together. 
Counting in multiples	Count the groups as children are skip counting, children may use their fingers as they are skip counting. 	 Children make representations to show counting in multiples. 	Count in multiples of a number aloud. Write sequences with multiples of numbers. 2, 4, 6, 8, 10 5, 10, 15, 20, 25 , 30
Making equal groups and counting the total	  Use manipulatives to create equal groups.	Draw  to show 2 x 3 = 6 Draw and make representations	2 x 4 = 8

Repeated addition	 Use different objects to add equal groups		
Understanding arrays	Use objects laid out in arrays to find the answers to 2 lots 5, 3 lots of 2 etc. 	Draw representations of arrays to show under-standing.	3 x 2 = 6 2 x 5 = 10

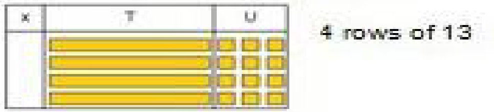
Year 2 – Multiplication			
Objective and Strategy	**Concrete**	**Pictorial**	**Abstract**
Doubling	Model doubling using dienes and PV counters. 	Draw pictures and representations to show how to double numbers.	Partition a number and then double each part before recombining it back together. 
Counting in multiples of 2, 3, 4, 5, 10 from 0 (repeated addition)	Count the groups as children are skip counting, children may use their fingers as they are skip counting. Use bar models.  5 + 5 + 5 + 5 + 5 + 5 + 5 + 5 = 40 	Number lines, counting sticks and bar models should be used to show representation of counting in multiples.   	Count in multiples of a number aloud. Write sequences with multiples of numbers. 0, 2, 4, 6, 8, 10 0, 3, 6, 9, 12, 15 0, 5, 10, 15, 20, 25 , 30 4 x 3 = ?

Multiplication is commutative	Create arrays using counters and cubes and Numicon.    **Pupils should understand that an array can represent different equations and that, as multiplication is commutative, the order of the multiplication does not affect the answer.**  	**Use representations of arrays to show different calculations and explore commutativity.** 	$12 = 3 \times 4$ $12 = 4 \times 3$ Use an array to write multiplication sentences and reinforce repeated addition.  $5 + 5 + 5 = 15$ $3 + 3 + 3 + 3 + 3 = 15$ $5 \times 3 = 15$ $3 \times 5 = 15$
Using the Inverse *This should be taught alongside division, so pupils learn how they work alongside each other.*		 	**2 x 4 = 8** **4 x 2 = 8** **8 ÷ 2 = 4** **8 ÷ 4 = 2** **8 = 2 x 4** **8 = 4 x 2** **2 = 8 ÷ 4** **4 = 8÷ 2** **Show all 8 related fact family sentences.**

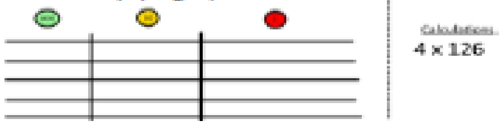
<table>
<tr><td colspan="4">Year 3 – Multiplication</td></tr>
<tr><td>Objective and Strategy</td><td>Concrete</td><td>Pictorial</td><td>Abstract</td></tr>
<tr>
<td>Grid method</td>
<td>
Show the links with arrays to first introduce the grid method.



Move onto base ten to move towards a more compact method.

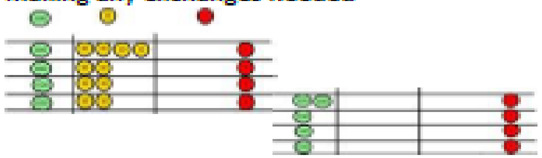


Move on to place value counters to show how we are finding groups of a number. We are multiplying by 4 so we need 4 rows



Fill each row with 126

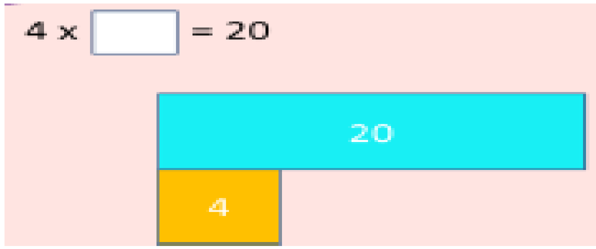
Add up each column, starting with the ones making any exchanges needed

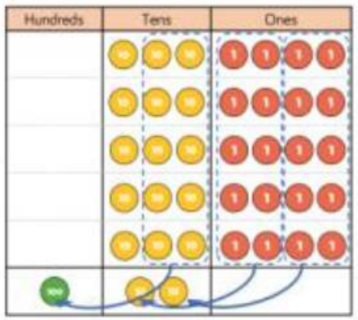


Then you have your answer.
</td>
<td>
Children can represent their work with place value counters in a way that they understand.

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

Bar model are used to explore missing numbers

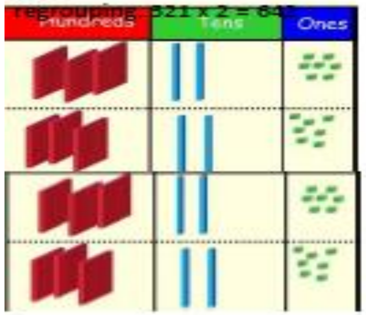
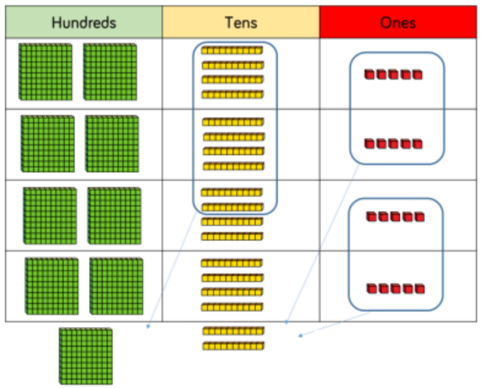
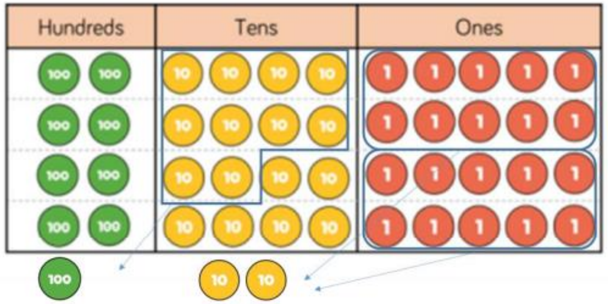
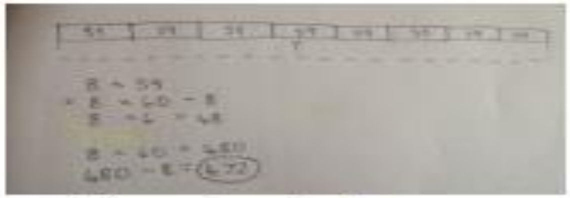


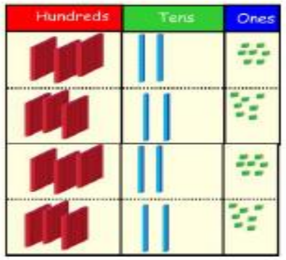


$34 \times 5 = 170$
</td>
<td>
Teachers may decide to first look at the expanded column method before moving on to the short multiplication method.

<table>
<tr><td></td><td>H</td><td>T</td><td>O</td><td></td></tr>
<tr><td></td><td></td><td>3</td><td>4</td><td></td></tr>
<tr><td>×</td><td></td><td></td><td>5</td><td></td></tr>
<tr><td></td><td></td><td>2</td><td>0</td><td>(5 × 4)</td></tr>
<tr><td>+</td><td>1</td><td>5</td><td>0</td><td>(5 × 30)</td></tr>
<tr><td></td><td>1</td><td>7</td><td>0</td><td></td></tr>
</table>

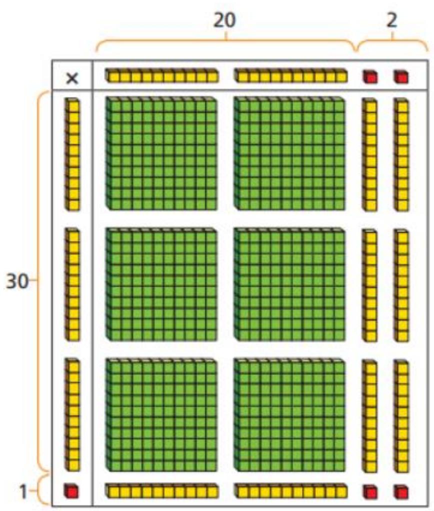
<table>
<tr><td></td><td>H</td><td>T</td><td>O</td><td></td></tr>
<tr><td></td><td></td><td>3</td><td>4</td><td></td></tr>
<tr><td>×</td><td></td><td></td><td>5</td><td></td></tr>
<tr><td></td><td>1</td><td>7</td><td>0</td><td></td></tr>
<tr><td></td><td>1</td><td>2</td><td></td><td></td></tr>
</table>
</td>
</tr>
</table>

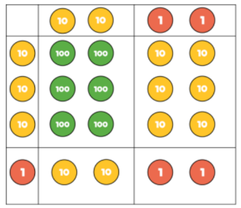
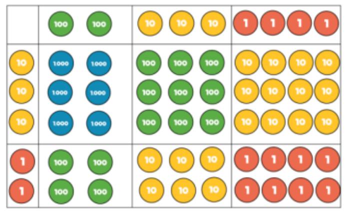
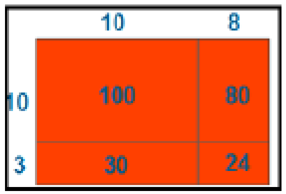
Year 4 – Multiplication			
Objective and Strategy	**Concrete**	**Pictorial**	**Abstract**
Column multiplication Recap from year 3 for 2 digits x 1 digit Move to multiplying 3 digit numbers by 1 digit *(year 4 expectation)*	Children can continue to be supported by place value counters at the stage of multiplication. This initially done where there is no regrouping. 321 x 2 = 642  It is important at this stage that they always multiply the ones first. The corresponding long multiplication is modelled alongside. 	  Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods.	327 x 4 28 80 1200 1308 This may lead to a compact method. <table><tr><td></td><td>H</td><td>T</td><td>O</td></tr><tr><td></td><td>2</td><td>4</td><td>5</td></tr><tr><td>×</td><td></td><td></td><td>4</td></tr><tr><td></td><td>9</td><td>8</td><td>0</td></tr><tr><td></td><td>1</td><td>2</td><td></td></tr></table>

<table>
<tr><th colspan="4">Year 5/6 – Multiplication</th></tr>
<tr><th>Objective and Strategy</th><th>Concrete</th><th>Pictorial</th><th>Abstract</th></tr>
<tr>
<td>Column Multiplication for 3 and 4 digits x 1 digit</td>
<td>


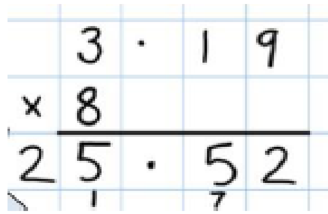
It is important at this stage that they always multiply the ones first.

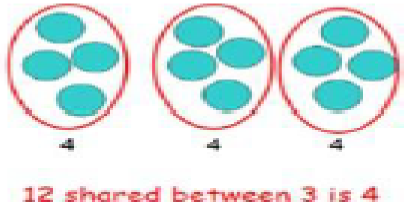
Children can continue to be supported by place value counters at the stage of multiplication. This initially done where there is no regrouping. 321 x 2 = 642
</td>
<td>
<table>
<tr><th>x</th><th>300</th><th>20</th><th>7</th></tr>
<tr><td>4</td><td>1200</td><td>80</td><td>28</td></tr>
</table>
</td>
<td>
<table>
<tr><td></td><td>327</td></tr>
<tr><td>x</td><td>4</td></tr>
<tr><td></td><td>28</td></tr>
<tr><td></td><td>80</td></tr>
<tr><td></td><td>1200</td></tr>
<tr><td></td><td>1308</td></tr>
</table>
<table>
<tr><td></td><td>3</td><td>2</td><td>7</td></tr>
<tr><td>x</td><td></td><td></td><td>4</td></tr>
<tr><td>1</td><td>3</td><td>0</td><td>8</td></tr>
<tr><td></td><td>1</td><td>2</td><td></td></tr>
</table>
This will lead to a compact method.
</td>
</tr>
<tr>
<td>Column multiplication</td>
<td>
Manipulatives may still be used with the corresponding long multiplication modelled alongside.

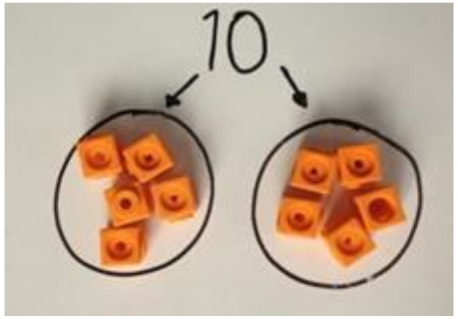
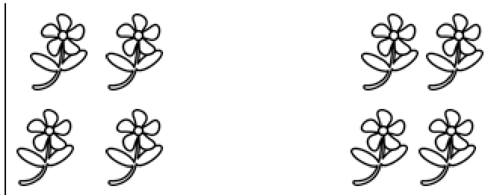
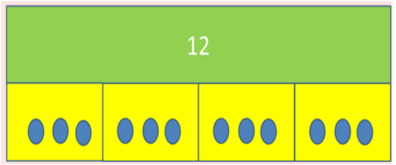
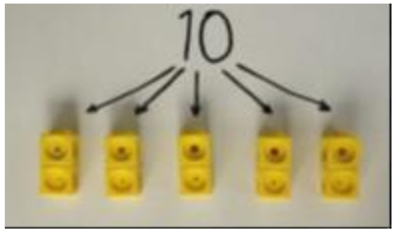
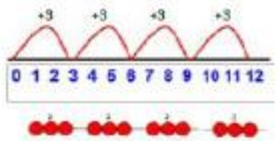
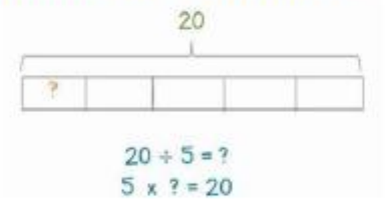


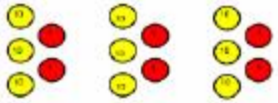
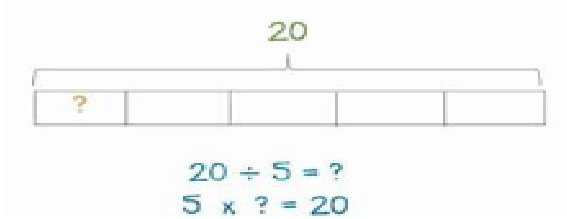
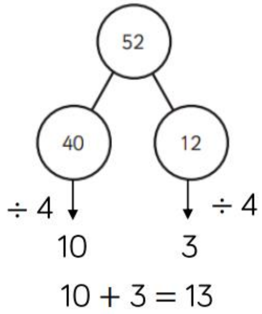
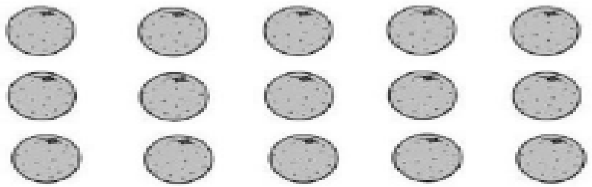
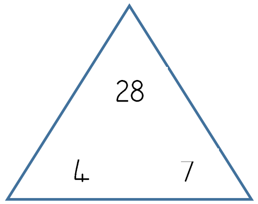
</td>
<td>




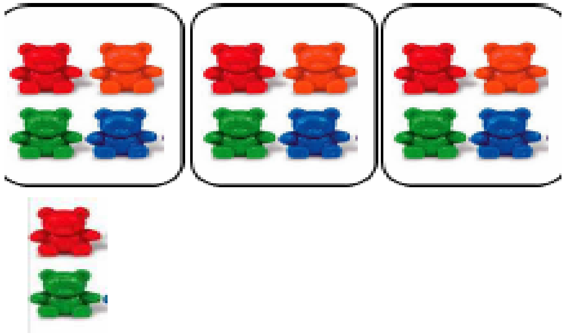
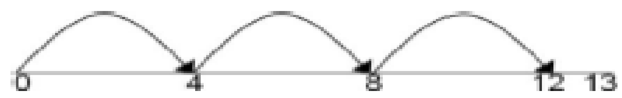
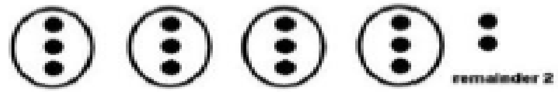
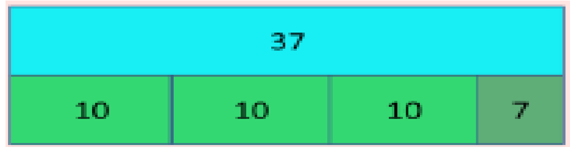
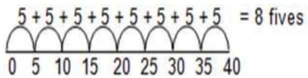
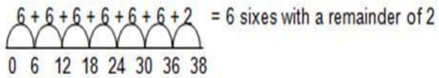
<table>
<tr><th>×</th><th>20</th><th>2</th></tr>
<tr><td>30</td><td>600</td><td>60</td></tr>
<tr><td>1</td><td>20</td><td>2</td></tr>
</table>
<table>
<tr><th>×</th><th>200</th><th>30</th><th>4</th></tr>
<tr><td>30</td><td>6,000</td><td>900</td><td>120</td></tr>
<tr><td>2</td><td>400</td><td>60</td><td>8</td></tr>
</table>
Continue to use bar modelling to support problem solving.
</td>
<td>
<table>
<tr><th></th><th>H</th><th>T</th><th>O</th></tr>
<tr><td></td><td></td><td>2</td><td>2</td></tr>
<tr><td>×</td><td></td><td>3</td><td>1</td></tr>
<tr><td></td><td></td><td>2</td><td>2</td></tr>
<tr><td></td><td>6</td><td>6</td><td>0</td></tr>
<tr><td></td><td>6</td><td>8</td><td>2</td></tr>
</table>
<table>
<tr><td></td><td></td><td>1</td><td>8</td></tr>
<tr><td></td><td>×</td><td>1</td><td>3</td></tr>
<tr><td></td><td></td><td>5 (2)</td><td>4</td></tr>
<tr><td></td><td>1</td><td>8</td><td>0</td></tr>
<tr><td></td><td>2</td><td>3</td><td>4</td></tr>
</table>
18 x 3 on the first row
(8 x 3 =24, carrying the 2 for 20, then 1 x 3)
18 x 10 on the 2nd row. Show multiplying by 10 by putting zero in units first
<table>
<tr><td></td><td>1</td><td>2</td><td>3</td><td>4</td><td></td></tr>
<tr><td>×</td><td></td><td></td><td>1</td><td>6</td><td></td></tr>
<tr><td></td><td>7</td><td>4</td><td>0</td><td>4</td><td>(1234 × 6)</td></tr>
<tr><td>1</td><td>2</td><td>3</td><td>4</td><td>0</td><td>(1234 × 10)</td></tr>
<tr><td>1</td><td>9,</td><td>7</td><td>4</td><td>4</td><td></td></tr>
</table>
<table>
<tr><th>Th</th><th>H</th><th>T</th><th>O</th></tr>
<tr><td></td><td>2</td><td>3</td><td>4</td></tr>
<tr><td>×</td><td></td><td>3</td><td>2</td></tr>
<tr><td></td><td>4</td><td>6</td><td>8</td></tr>
<tr><td>1 7</td><td>1 0</td><td>2</td><td>0</td></tr>
<tr><td>7</td><td>4</td><td>8</td><td>8</td></tr>
</table>
</td>
</tr>
</table>

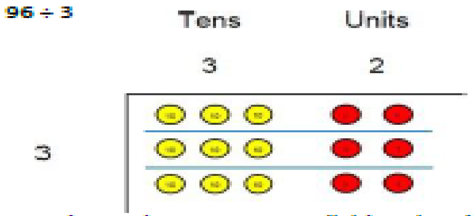
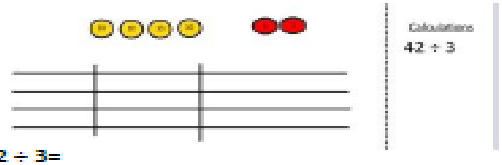
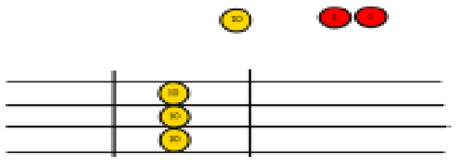
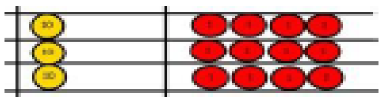
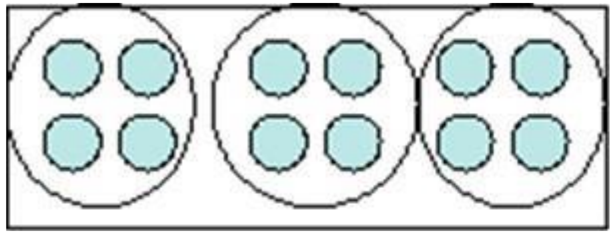
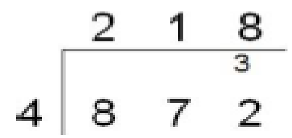
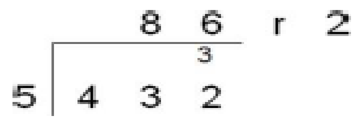
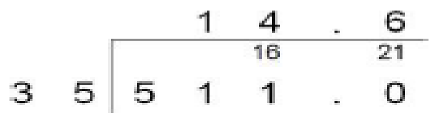
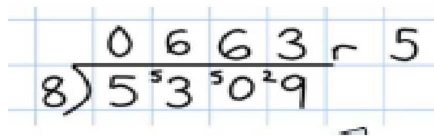
Multiplying decimals up to 2 decimal places by a single digit.			Remind children that the single digit belongs in the units column. Line up the decimal points in the question and the answer. 

EYFS/Year 1 – Division			
Objective and Strategy	**Concrete**	**Pictorial**	**Abstract**
Division as sharing	 	Children use pictures or shapes to share quantities. 	12 shared between 3 is 4.

Year 2 – Division			
Objective and Strategy	**Concrete**	**Pictorial**	**Abstract**
Division as sharing	 I have 10 cubes, can you share them equally in 2 groups?	Children use pictures or shapes to share quantities.  8 ÷ 2 = 4 Children use bar modelling to show and support understanding. 12 ÷ 4 = 3 	12 ÷ 3 = 4
Division as grouping.	Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding. 	Use number lines for grouping  12 ÷ 3 = 4 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. 	28 ÷ 7 = 4 Divide 28 into 7 groups. How many are in each group?

Year 3 – Division			
Objective and Strategy	**Concrete**	**Pictorial**	**Abstract**
Division as grouping	Use cubes, counters, objects or place value counters to aid understanding.  24 divided into groups of 6 = 4 96 ÷ 3 = 32 	Continue to use bar modelling to aid solving division problems.   52 ÷ 4 = 13	How many groups of 6 in 24? 24 ÷ 6 = 4
Division with arrays	 Link division to multiplication by creating an array and thinking about the number sentences that can be created. Eg 15 ÷ 3 = 5 5 x 3 = 15 15 ÷ 5 = 3 3 x 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 eight linking number sentences. 7 x 4 = 28 4 x 7 = 28 28 ÷ 7 = 4 28 ÷ 4 = 7 28 = 7 x 4 28 = 4 x 7 4 = 28 ÷ 7 7 = 28 ÷ 4 

Division with remainders	14 ÷ 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.**  **Use bar models to show division with remain-ders.**  Example without remainder: 40 ÷ 5 Ask "How many 5s in 40?"  Example with remainder: 38 ÷ 6  For larger numbers, when it becomes inefficient to count in single multiples, bigger jumps can be recorded using known facts.	**Complete written divisions and show the remainder using r.** 

Year 4, 5 and 6 – Division			
Objective and Strategy	**Concrete**	**Pictorial**	**Abstract**
Divide at least 3 digit numbers by 1 digit. Short Division	 Use place value counters to divide using the bus stop method alongside  42 ÷ 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.  Move onto divisions with a remainder.  Finally move into decimal places to divide the total accurately.  

Year 6 – Long Division

1. Divide.

$$\begin{array}{rccc} & h & t & o \\ & 1 & & \\ \cline{2-4} 2) & 2 & 7 & 8 \end{array}$$

Two goes into 2 one time, or 2 hundreds ÷ 2 = 1 hundred.

2. Multiply & subtract.

$$\begin{array}{rccc} & h & t & o \\ & 1 & & \\ \cline{2-4} 2) & 2 & 7 & 8 \\ & -2 & & \\ \cline{2-2} & 0 & & \end{array}$$

Multiply 1 × 2 = 2, write that 2 under the two, and subtract to find the remainder of zero.

3. Drop down the next digit.

$$\begin{array}{rccc} & h & t & o \\ & 1 & 8 & \\ \cline{2-4} 2) & 2 & 7 & 8 \\ & -2 & \downarrow & \\ \cline{2-2} & 0 & 7 & \end{array}$$

Next, drop down the 7 of the tens next to the zero.

Divide.

$$\begin{array}{rccc} & h & t & o \\ & 1 & 3 & \\ \cline{2-4} 2) & 2 & 7 & 8 \\ & -2 & & \\ \cline{2-2} & 0 & 7 & \end{array}$$

Divide 2 into 7. Place 3 into the quotient.

Multiply & subtract.

$$\begin{array}{rccc} & h & t & o \\ & 1 & 3 & \\ \cline{2-4} 2) & 2 & 7 & 8 \\ & -2 & & \\ \cline{2-2} & 0 & 7 & \\ & - & 6 & \\ \cline{2-3} & & 1 & \end{array}$$

Multiply 3 × 2 = 6, write that 6 under the 7, and subtract to find the remainder of 1 ten.

Drop down the next digit.

$$\begin{array}{rccc} & h & t & o \\ & 1 & 3 & \\ \cline{2-4} 2) & 2 & 7 & 8 \\ & -2 & & \\ \cline{2-2} & 0 & 7 & \\ & - & 6 & \\ \cline{2-3} & & 1 & 8 \end{array}$$

Next, drop down the 8 of the ones next to the 1 leftover ten.

1. Divide.

$$\begin{array}{rccc} & h & t & o \\ & 1 & 3 & 9 \\ \cline{2-4} 2) & 2 & 7 & 8 \\ & -2 & & \\ \cline{2-2} & 0 & 7 & \\ & - & 6 & \\ \cline{2-3} & & 1 & 8 \end{array}$$

Divide 2 into 18. Place 9 into the quotient.

2. Multiply & subtract.

$$\begin{array}{rccc} & h & t & o \\ & 1 & 3 & 9 \\ \cline{2-4} 2) & 2 & 7 & 8 \\ & -2 & & \\ \cline{2-2} & 0 & 7 & \\ & - & 6 & \\ \cline{2-3} & & 1 & 8 \\ & - & 1 & 8 \\ \cline{3-4} & & & 0 \end{array}$$

Multiply 9 × 2 = 18, write that 18 under the 18, and subtract to find the remainder of zero.

3. Drop down the next digit.

$$\begin{array}{rccc} & h & t & o \\ & 1 & 3 & 9 \\ \cline{2-4} 2) & 2 & 7 & 8 \\ & -2 & & \\ \cline{2-2} & 0 & 7 & \\ & - & 6 & \\ \cline{2-3} & & 1 & 8 \\ & - & 1 & 8 \\ \cline{3-4} & & & 0 \end{array}$$

There are no more digits to drop down. The quotient is 139.