Ashton West End Primary Academy

KS1 and KS2 Calculation Policy
2021-2022

September 2021

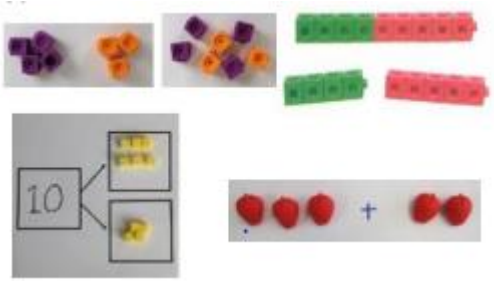
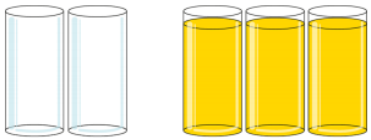
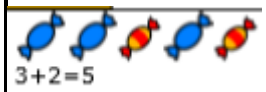
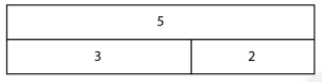
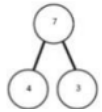
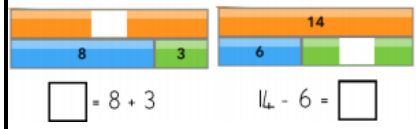
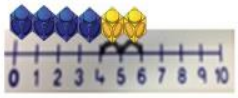
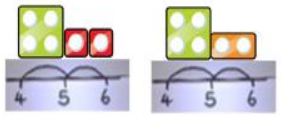
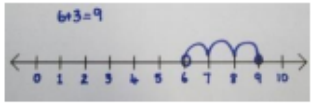
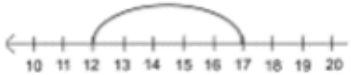
This calculation policy reflects the methods taught pictorially, concretely and abstractly to the maths National Curriculum objectives (2014). Teachers should use this to help with their planning, as well as guiding children to build and develop their mathematical skills and methods.

Due to missed learning throughout the Covid-19 crisis of lockdowns and isolations; Ashton West End Primary Academy's staff scrutinise their maths planning to help plug in any missed learning. Throughout 2020-2021, teachers were given extra maths learning time to plug in gaps based on learning evidence from the children in assessments and lessons. Teachers were also given mandatory concepts to plug into the children before leaving their previous class to help them have prior learning knowledge in their current class.

Teachers should refer to these methods in the calculation policy and apply them to the preferred year group. Teachers may need to refer to the previous year group to help consolidate learning. This will help to ensure children are being taught these efficient calculation methods to achieve the National Curriculum maths objectives.

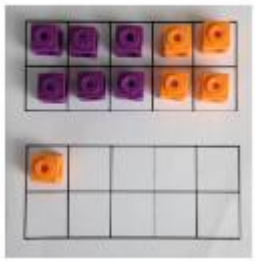
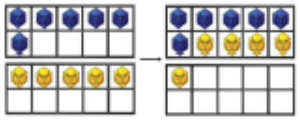
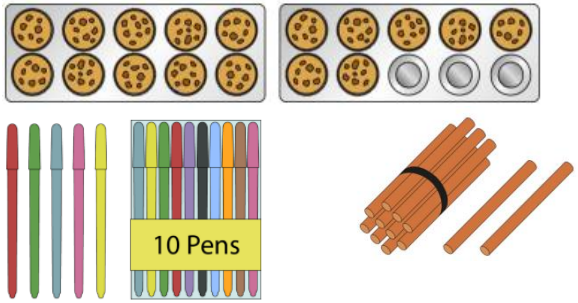
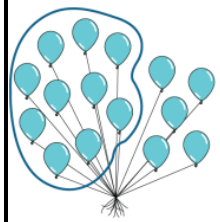
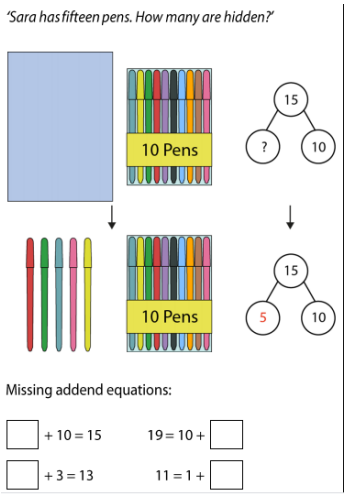
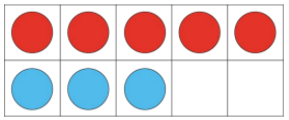
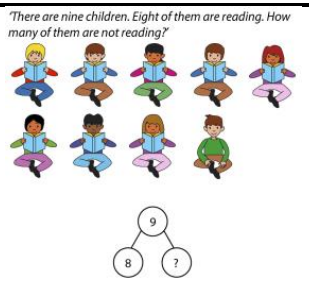
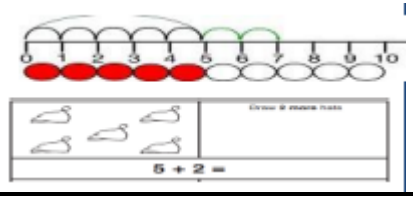
Addition

Year 1

Objective and Strategy	Concrete	Pictorial	Abstract
Combing two parts to make a whole: part-whole model	Use part part whole models. Use cubes to add two numbers together as a group or in a bar. 	Using pictures to add two numbers together as a group or in a bar. *'There are three full glasses and two empty glasses. We can write this as three plus two.'* 3 + 2  2 + 3 *'There are two empty glasses and three full glasses. We can write this as two plus three.'* 2 + 3  3+2=5 Cherry representation:  Bar model: 	Use the part-part-whole diagram to move into the abstract. 4 + 3 = 7 (4 is a part, 3 is a part, 7 is a whole)  2 + 3 = 5 5 = 3 + 2 2 + □ = 5 2 + 3 = □ 3 + 2 = 5 5 = 2 + 3 □ + 3 = 5 Bar models used to show relationship between addition and subtraction. 
Starting at the bigger number and counting on.	 Counting on using number lines using concrete resources.    Start with the larger number on the bead string and the count on to find the smaller number, 1 by 1, to find the answer.	Use a number line to count on in ones or in one jump to find the answer. Starting at the larger number on the number line.  12 + 5 = 17 	5+12=17 Place the larger number in your head and count on the smaller number to find your answer. Counting on using twos. The abstract number line: What is 2 more than 4? What is the sum of 2 and 4? What is the total of 4 and 2? 4 + 2 

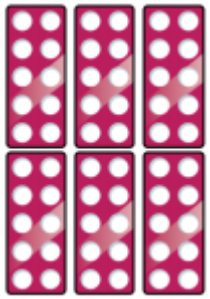
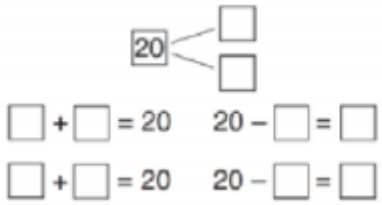
Addition

Year 1

Regrouping to make 10	Using ten frames and concrete resources. Using Numicon for an alternative. 6 + 5 = 11   6 + 5 	Using pictures of objects and regroup or partition the smaller number to make 10. Starting to applying tens and ones.  Ten ones are visible:  10s: 1 | 1s: 5 'The 1 means one ten, and the 5 means five ones.'	Developing an understanding of grouping ten and applying this into a part part whole model or into equations to develop equality. 
Represent and use number bonds and related subtraction facts within 20.	2 more than 5   Using tens frames to apply children's knowledge of 5 + 3 = 8 and 3 + 5 = 8 then applying it to subtraction facts: 8 – 5 = 3 and 8 – 3 = 5	 Using pictorial images and applying them to the part part whole model.  Using number lines and beads.	Emphasis should be on language: 8 – 5 = □ '8 is 3 more than 5' □ + 6 = 9 '3 more than 6 is 9' 6 + 3 = □ '3 is less than 4, so 6 plus 3 is 1 less than 10'

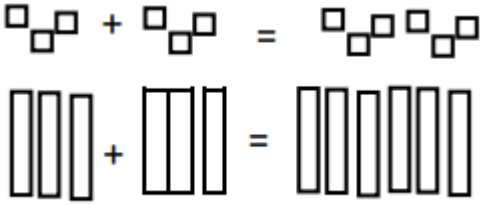
Addition

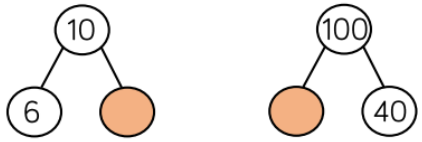
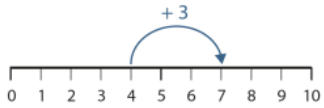
Year 2

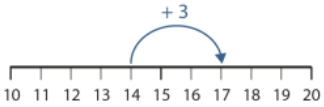
Objective and Strategy	Concrete	Pictorial	Abstract
Adding multiples of ten.	 Using numicon to represent 10. 60 = 10 + 10 + 10 + 10 + 10 + 10 50= 30 = 20  Model using dienes and bead strings	 3 tens + 5 tens = _____ tens 30 + 50 = _____ Use representations for base ten.	20 + 30 = 50 70 = 50 + 20 40 + □ = 60
Use known number facts. Part part whole	 Children explore ways of making numbers within 20.	 20 □ + □ = 20 20 – □ = □ □ + □ = 20 20 – □ = □	□ + 1 = 16 16 – 1 = □ 1 + □ = 16 16 – □ = 1

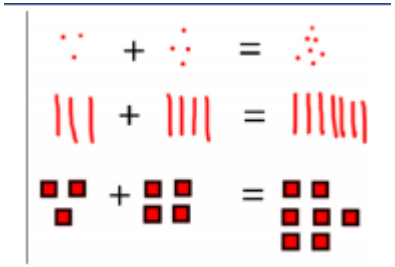
Addition

Year 2

<table>
<tr>
<td>Using known facts.</td>
<td> 

Children explore ways of using known facts.</td>
<td> 


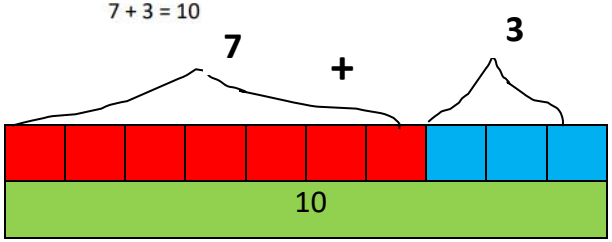
4 + 3 = 7


14 + 3 = 17

Children to draw representations of H, T and O.</td>
<td>3 + 4 = 7

leads to

30 + 40 = 70

leads to

300 + 400 = 700</td>
</tr>
<tr>
<td>Bar model</td>
<td> 
3 + 4 = 7</td>
<td> 
7 + 3 = 10

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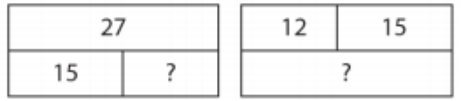
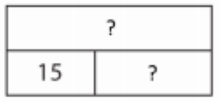
<td> 

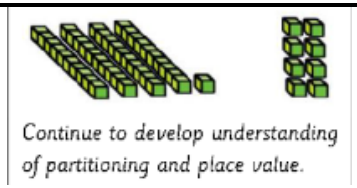


15 + 12 = 27</td>
</tr>
</table>

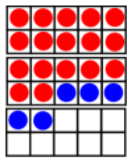
Addition

Year 2

Add a two-digit number and ones.



Continue to develop understanding of partitioning and place value.



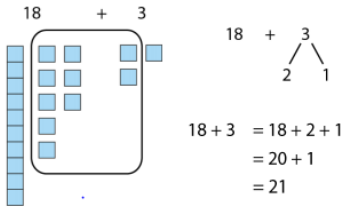
17 + 5 = 22

Use ten frame to make 'magic ten

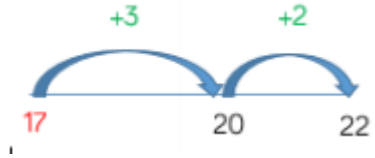
Children explore the pattern.

17 + 5 = 22

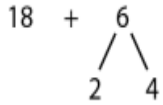
27 + 5 = 32



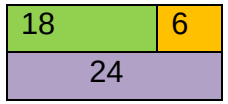
Using dienes, part whole and number lines to model.



18 + 6 = ☐



Explore related facts:



6 + ☐ = 24

24 – 6 = ☐

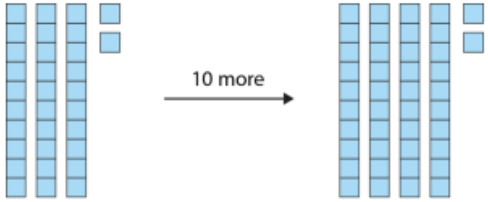
☐ – 18 = 6

Add a two-digit number and tens.

25 + 10 = 35

Explore that the ones digit does not change

Using the dienes frames:

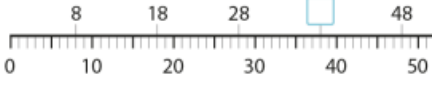


'We had three tens and two ones. Ten more gives us four tens and two ones.'

Using number squares to 100:

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

'Ten more than forty-two is fifty-two'.

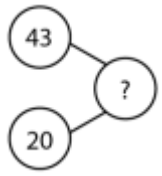


28	38	48					

23 + 10 = ☐

33 + ☐ = 43

☐ + 10 = 53



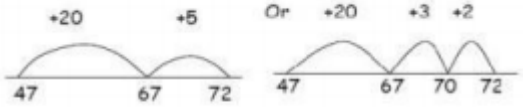
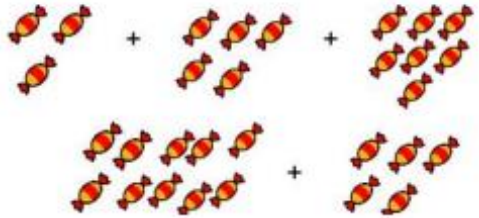
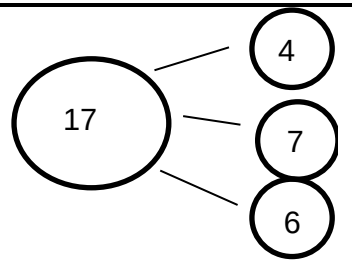
27 + 10 = 37

27 + 20 = 47

27 + □ = 57

Addition

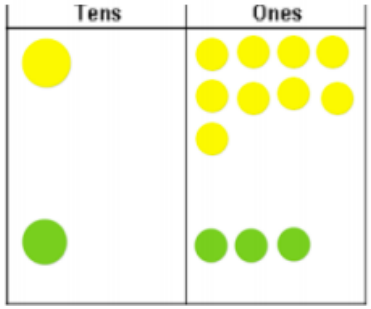
Year 2

		Using number lines: 27 + 30 +10 +10 +10 27 37 47 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.	45 + 23 40 5 20 3 40 + 20 = 60 5 + 3 = 8 60 + 8 = 68
Adding 3 single digit numbers.	**4 + 7 + 6 = 17** Put 4 and 6 together to make 10. Add on 7.   Combine to make 10 first if possible, or bridge 1o then add third digit	Add together three groups of objects. Draw a picture to recombine the groups to make 10. 	 17 4 7 6 Combining the 4 + 6 to make 10, then adding the 7.  5 4 2 3 7 8 5 7 3

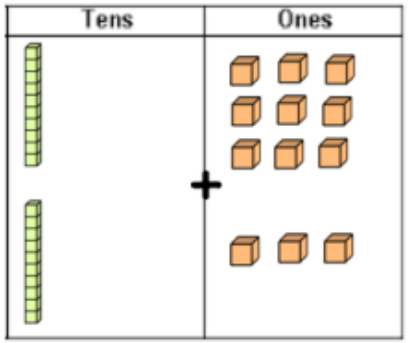
Addition

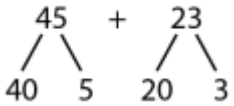
Year 2

To begin with column addition – no grouping then beginning to group ones and tens.



Use place value counters and ienes to provide support.





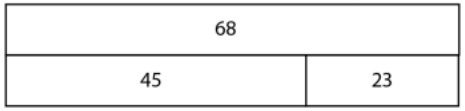
'First I partition the forty-five into forty and five, twenty-three into twenty and three.'

40+20=60
'Forty plus twenty is equal to sixty..'

5+3 = 8
'...five plus three is equal to eight..'

60+8=68
'...and sixty plus eight is equal to sixty-eight.'

45+23 = 68
'So forty-five plus twenty-three is equal to sixty-eight.'



Using a bar model to represent the calculation.

Expanded method:

19
+13
12
20
32

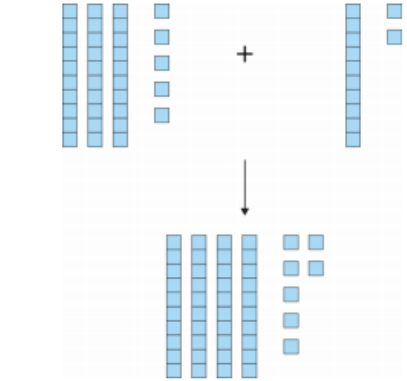
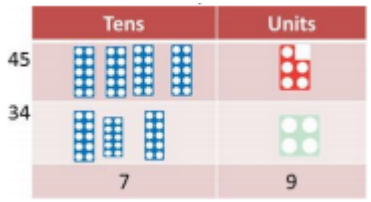
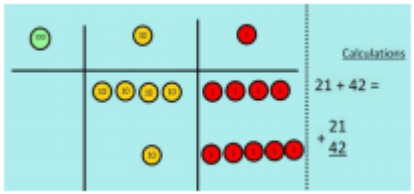
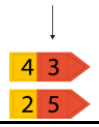
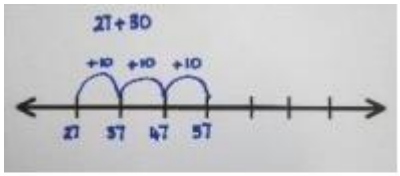
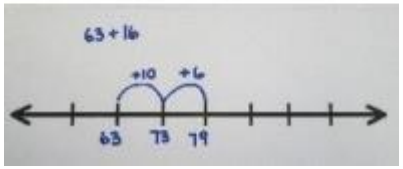
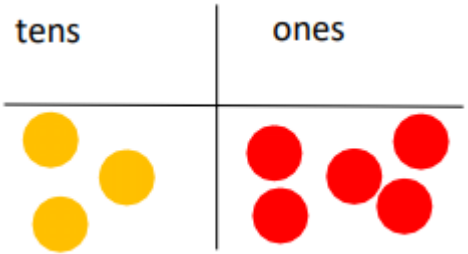
Without renaming:

18
+ 11
2 9

With renaming:

19
+ 13
32
1

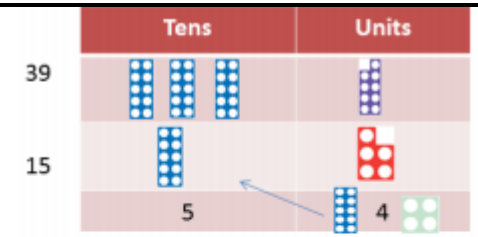
Start with using the expanded method, then move onto adding without exchanging ones and tens. Next, move onto exchanging with tens and ones.

Objective and Strategy	Concrete	Pictorial	Abstract
Column Addition – no grouping (friendly numbers) Add two or three 2 or 3 digit numbers.	Dienes:  Model using Dienes or Numicon.  Add together the ones first, then the tens.  Move to using place value counters.   This also can be supported using arrow cards.	 Using number lines.   Children move to drawing the counters using a tens and one frame.	$$\begin{array}{r} 223 \\ +\ 114 \\ \hline 337 \end{array}$$ Add the ones first, then the tens, then the hundreds.

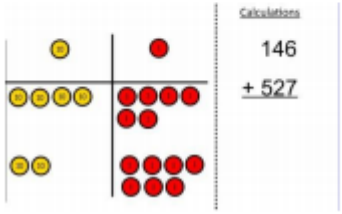
Addition

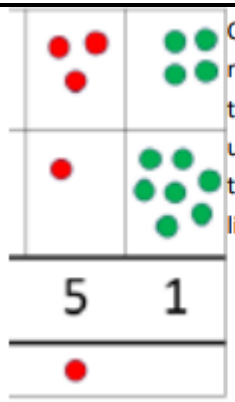
Year 3

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

87 + 56 = 130

87 + 56 = 130 + 13 = 143

80 7 50 6

80 + 7
50 + 6

130 + 13 = 143

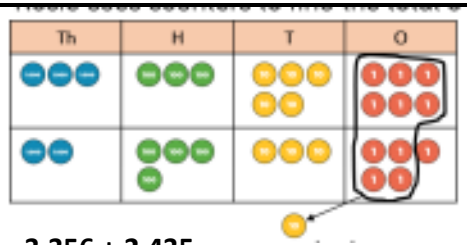
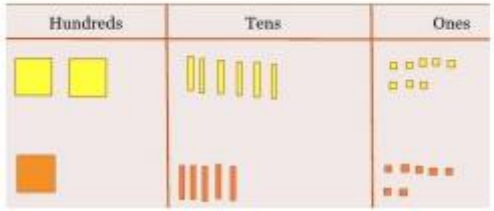
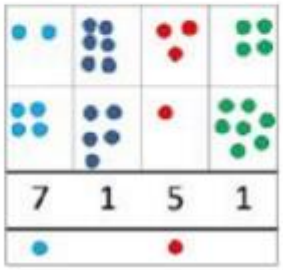
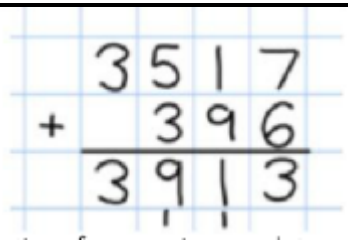
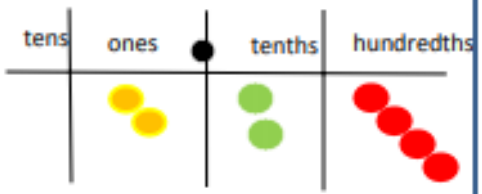
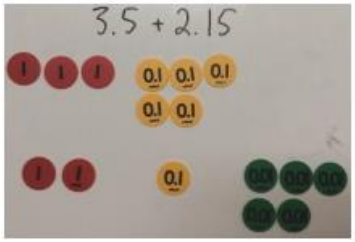
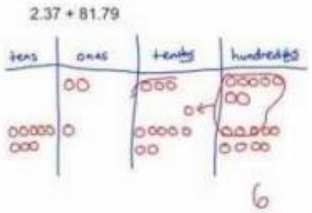
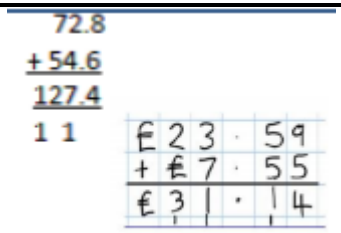
87
+ 56

143

1 1

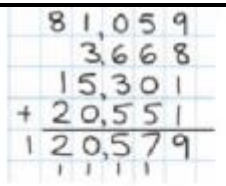
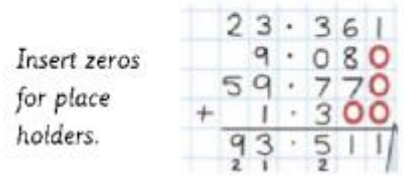
Addition

Year 4-6

Objective and Strategy	Concrete	Pictorial	Abstract
Y4 – add numbers with up to 4 digits	 **3,356 + 2.435** 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. 	Children can draw a pictorial representation of the columns and place value counters to further support their learning and understanding. 	 Continue from revious work to carry hundreds as well as tens. Relate to money and measures.
Y5 – add numbers with more than 4 digits. Add decimals with 2 decimal places, including money.	As year 4  Introduce decimal place value counters and model exchange for addition.	 	

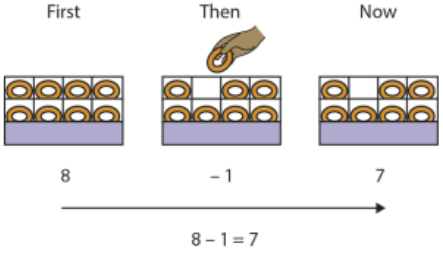
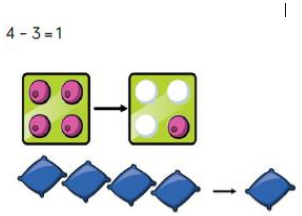
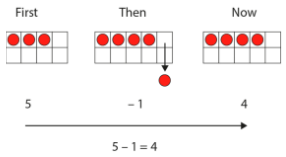
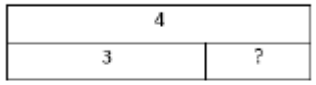
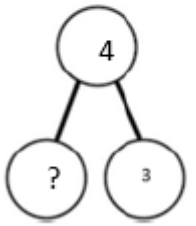
Addition

Year 4-6

Y6 – add several numbers of increasing complexity. Including adding money, measure and decimals with different numbers of decimal points.	AS Y5	As Y5	 

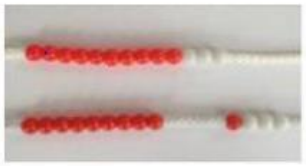
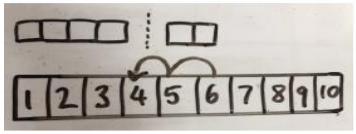
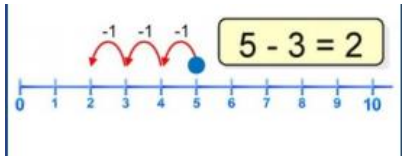
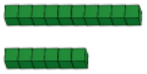
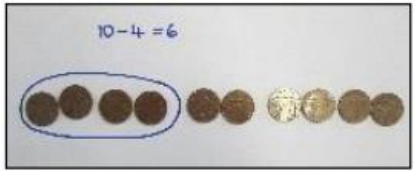
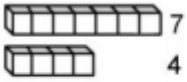
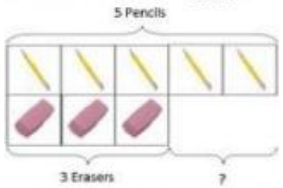
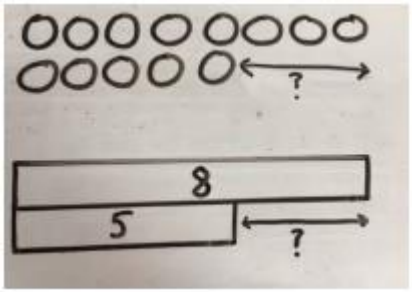
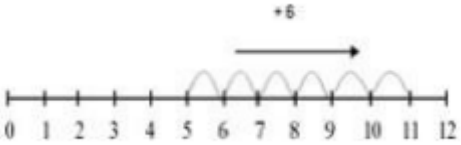
Subtraction

Year 1

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	Children to draw the concrete resources they are using and cross out the correct amount. The bar model can be used. 4-3=    7 – 2 = ___	10 – 1 = ☐ 5 – 1 = ☐ 9 – 1 = ☐ 4 – 1 = ☐ 8 – 1 = ☐ 3 – 1 = ☐ 7 – 1 = ☐ 2 – 1 = ☐ 6 – 1 = ☐ 1 – 1 = ☐ 4- 3 = ☐ = 4 – 3  
Counting back.	Using number lines or tracks. Make the large number. Move the beads along the bead string as you count backwards in ones.	Count back in ones using a number line to represent what they see pictorially.	Put 13 in your head, count back 4. What number are you at? Use your fingers to help.

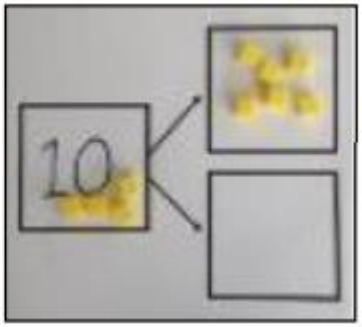
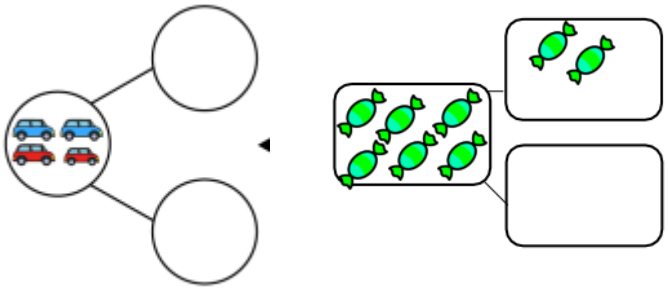
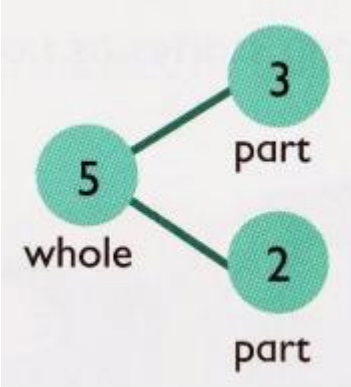
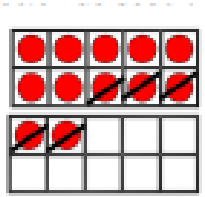
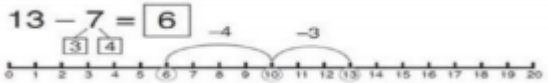
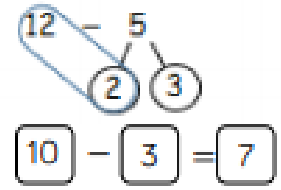
Subtraction

Year 1

	6 – 2 = 4  13 – 4 = 	  	
Find the difference	What's the difference between 10 and 6? The difference between 10 and 6 is ___ 10 – 6 = ___   Compare amounts and objects to find the difference.  'Seven is 3 more than four' 'I am 2 years older than my sister'  Lay objects to represent bar model. Use cubes, basic bar models, counters and other items to find the difference. How many more cakes does Whitney have than Teddy? Whitney Teddy Whitney has ___ more cakes than Teddy.	Draw the cubes or other resources used or use the bar model to illustrate what they need to calculate.  Count on using a number line to find the difference.  	Find the difference between 8 and 5. 8 – 5, the difference is ☐ Children to explore why 9 - 6 = 7 – 4 have the same difference. Hannah has 23 sandwiches; Helen has 15 sandwiches. Find the difference between the number of sandwiches

Subtraction

Year 1

Represent and use number bonds and related subtraction facts within 20. Part Part Whole model	Link to addition – use the part whole model to help explain the inverse between addition and subtraction,  **If 10 is the whole and 6 id one of the parts. What is the other part?** **10- 6 =** ☐	Use a pictorial representation of objects to show the part – part – whole model. Any objects can be used for this. 	Move to using numbers within the part-part-whole model. 
Make 10	12 – 5 Make 12 on the ten frame. Take 2 away to make ten, then take 3 more away to make 7. 	Children represent the ten frame pictorially and discuss what they did to make 10.  Use number lines. Start at 13. Take away 3 to reach 10. Then take away the remaining 4 so you have taken 7 altogether. You have reached your answer.  	Children to demonstrate how they can make 10 by partitioning the subtrahend.  16 – 7 How many do we take off first to get to 10? How many left to take off?

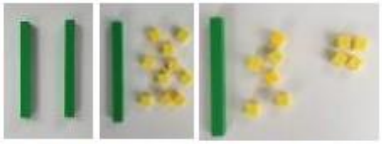
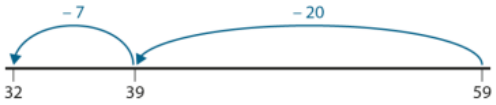
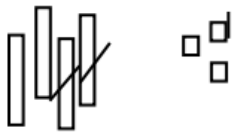
Subtraction

Year 1

Bar Model	 5—2 = 3		 17 - ☐ = 6 17 - ☐ = 11 17 = ☐ + 6 17 = 11 + ☐

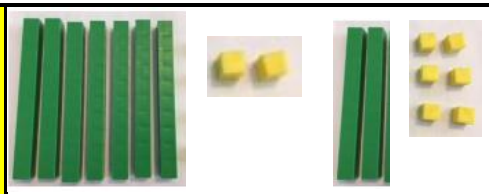
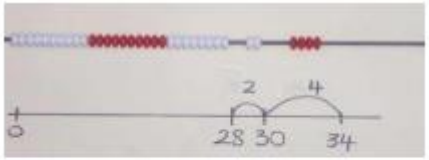
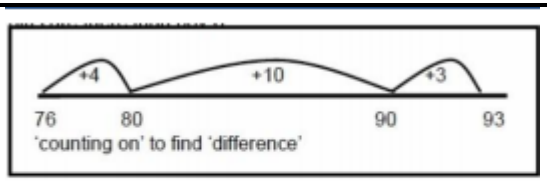
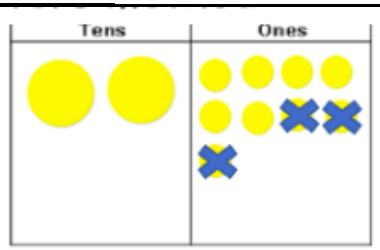
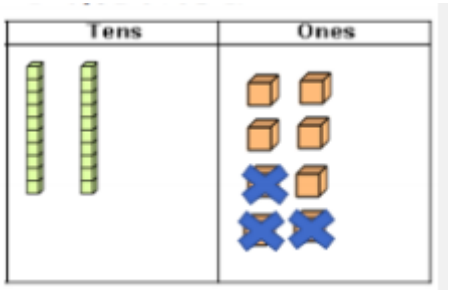
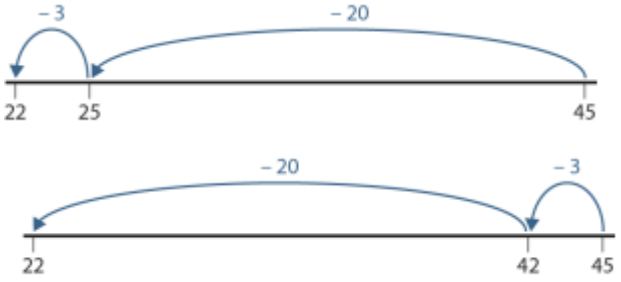
Subtraction

Year 2

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 =	20—4 = 16
Partitioning to subtract without regrouping 'friendly numbers'	78 minus 34 = ____ 8 ones – 4 ones = ____ 7 tens – 3 tens = ____ We have ____ tens and ____ ones. Tens / Ones   Use Dienes to show how to partition the number when subtracting without regrouping. 78 – 34 =  *Take three tens and four ones away*	 32 39 59 Part–part–whole diagram: 59 / 27 / ? 59- 27 = _____ 59 50 9 -20 - 7 30 2 Children draw representations of Dienes and cross off.  43—21 = 22	59 – 27 Using number lines and part-part whole model Partition the number 59 Partition 27 and subtract the ones and the tens. Place the partitioned number back together. 59-27=32

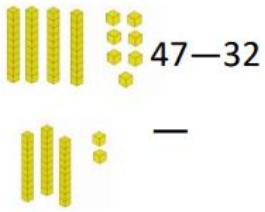
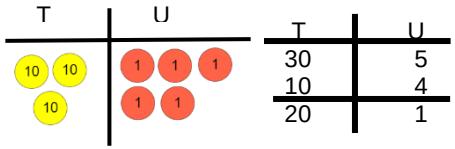
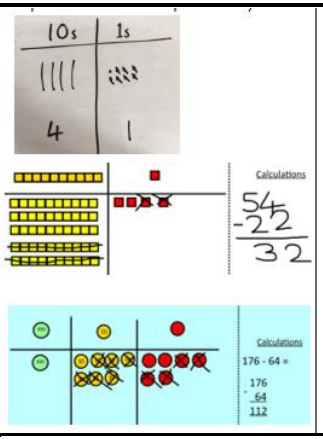
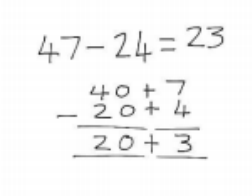
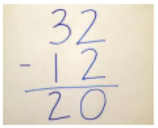
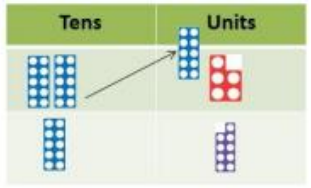
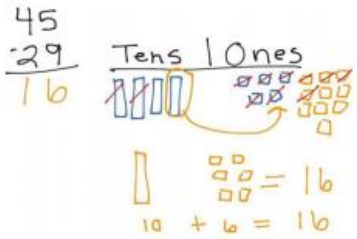
Subtraction

Year 2

Make ten strategy	 72-26 Use Dienes to model 72-2-20-4=46  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
Beginning to use the column method to subtract	 Use place value counters and Dienes to provide support. 	*'To subtract twenty-three, we can subtract twenty and then subtract three.'* 45 – 23 20 3 45 – 23 = 45 – 20 – 3 Use partitioning to aid subtracting and number lines. 	Expanded method: 29 -14 5 10 15 With renaming: 1 13 23 - 19 4 Without renaming: 28 - 3 25 Start with using the expanded method, then move onto adding without exchanging ones and tens. Next, move onto exchanging with tens and ones.

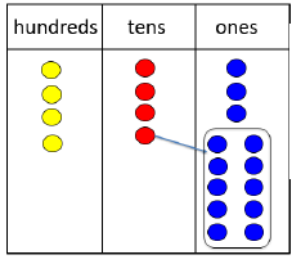
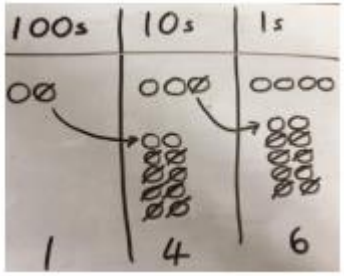
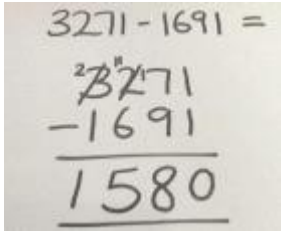
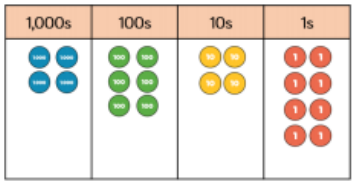
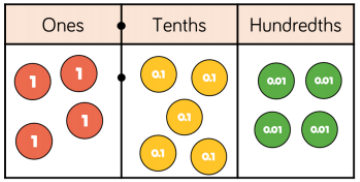
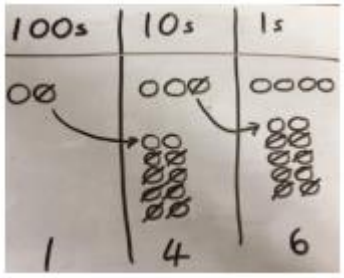
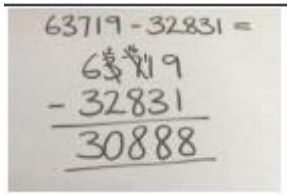
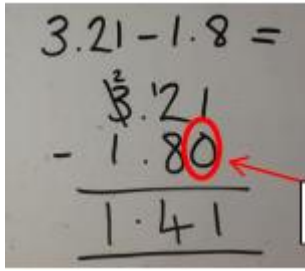
Subtraction

Year 3

Objective and Strategy	Concrete	Pictorial	Abstract
Column subtraction without regrouping (friendly numbers)	 Use base 10 or Numicon to model. 35-14=21  Use place value counters model how to partition numbers to subtract.	 Represent method pictorially.	 Intermediate step may be needed to lead to clear subtraction understanding. 
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.

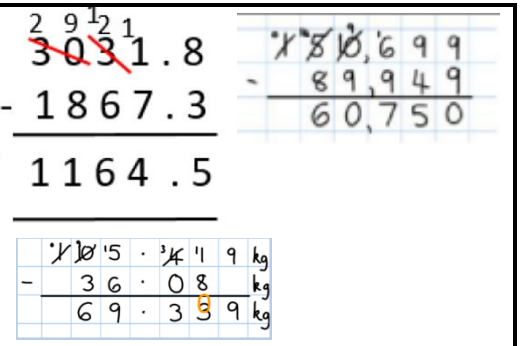
Subtraction

Year 4-6

Objective and Strategy	Concrete	Pictorial	Abstract
Subtracting tens and ones. Year 4 subtract with up to 4 digits. *Introduce decimal subtraction through context of money.*	3 1 4 4 3 -2 1 8 2 2 5  443 – 218 = 225 Model the process of exchanging using numicon, base ten and place value counters.	Draw the counters onto a place value grid and show what you have subtracted by crossing out the counters, as well as clearly showing the exchanges you make.  	 Use the phrase ‘take and make’ for exchange.
Year 5 – subtract with at least 4 digits, including money and measures. *Subtract with decimal values, including mixtures of integers and decimals and aligning the decimal.*	4,648 – 2,347  Follow through with Year 4, using base 10, numicon and place value counters.  4.54-1.4	Continue to draw the counters onto a place value grid and show what you have subtracted by crossing out the counters, as well as clearly showing the exchanges you make.  	  Demonstrate the 0 as a place holder.

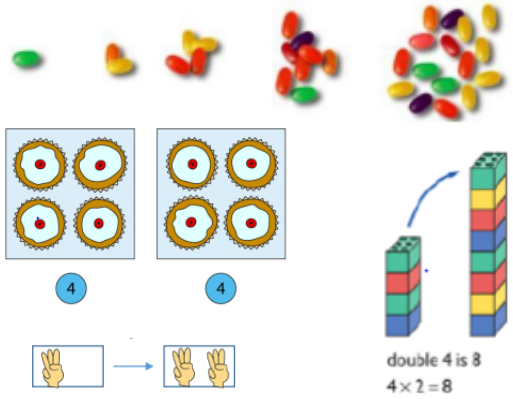
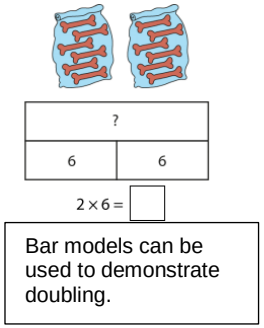
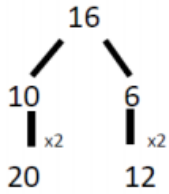
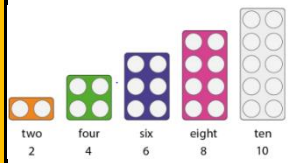
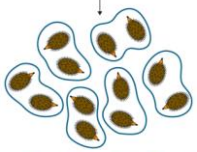
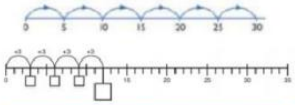
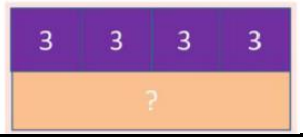
Subtraction

Year 4-6

Year 6 – subtract with increasingly large and more complex numbers and decimal values	Continue to use place value counters, numicon, base ten where appropriate.		

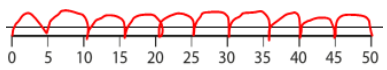
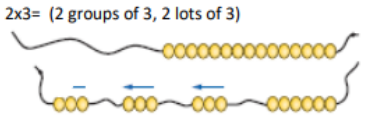
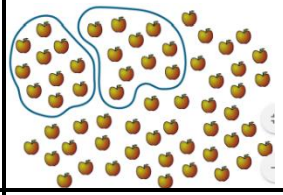
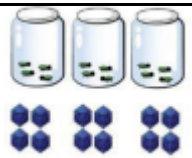
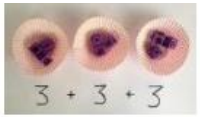
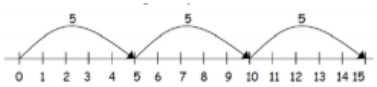
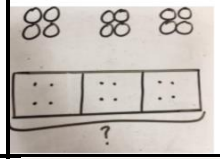
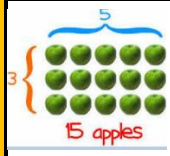
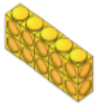
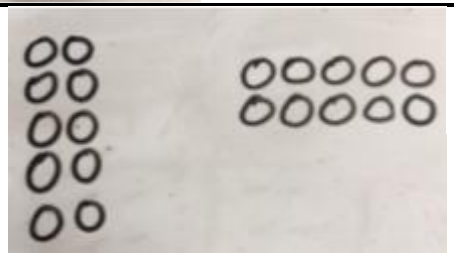
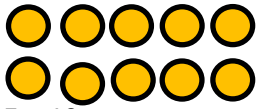
Multiplication

Year 1

Objective and Strategy	Concrete	Pictorial	Abstract
Doubling	 Using a range of practical activities and equipment to demonstrate doubling.	Draw pictures to demonstrate how to double numbers.   Bar models can be used to demonstrate doubling.	 Partition a number and then double each part before recombing it back together.
Counting in multiples	  Count the groups as children are skip counting. Children may use their fingers as they are skip counting.  	   	 Visual representations of objects can be demonstrated to show counting in multiples. Number lines, counting sticks and bar models can also be used to show representations of multiples.	Count in multiples of a number aloud. Write sequences of numbers. 2, 4, 6, 8, 10 5, 10, 15, 20, 25, 30 2 x 3 = ☐

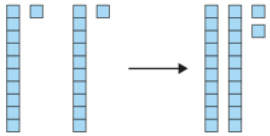
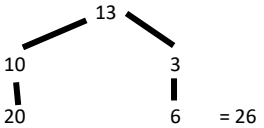
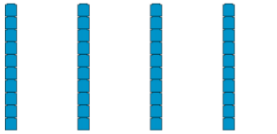
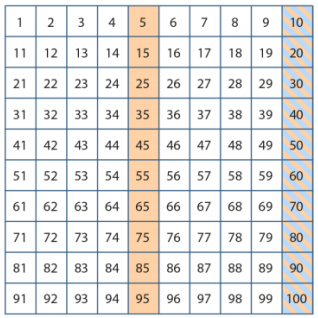
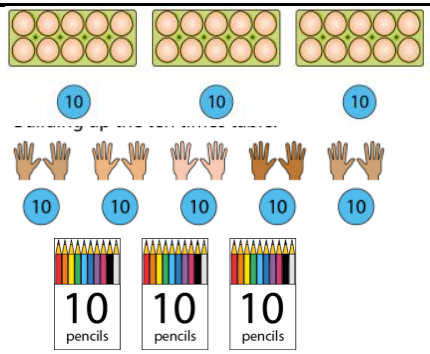
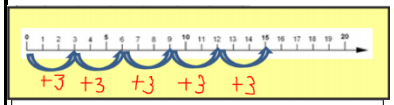
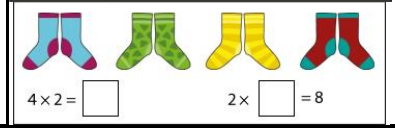
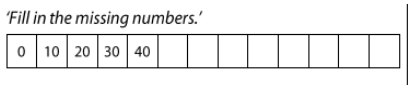
Multiplication

Year 1

Making equal groups and counting the total	 'How many groups of 5 are there to 50?' 10 x 5 = _____  Children to use beads, number lines and counting sticks to create equal groups.	Complete the sentences  There are ___ groups of ___ pencils.  There are ___ groups of ___ flowers.  Children to split objects into different groups. How many groups of 10 are there? What is the total amount? 6 x 10 = ____	2 x 6 = 12
Repeated addition	    Use different groups to add equal groups	 5 + 5 + 5 = 15  use pictorial including number lines to solve.  using bar models to represent repeated addition.	 Write addition sentences to describe objects and pictures
Understanding arrays	  2 lots of 5  5 lots of 2  Use and create arrays to show multiplication sentences.	 Children to draw the arrays pictorially.	Using arrays to write multiplication sentences.  5 + 5 = 10 2+2+2+2+2 = 10 2 x 5 = 10 5 x 2 = 10

Multiplication

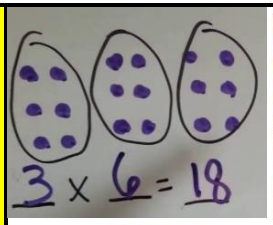
Year 2

Objective and Strategy	Concrete	Pictorial	Abstract
Doubling	 double 11 = double 10 + double 1 = 20 + 2 = 22 Model doubling using Dienes and place value counters.	Draw pictures and representations to show how to double numbers.	Partition a number and then double each part before recombining it back together. *'There are thirteen pairs of socks. How many socks are there altogether?'*  13 × 2 = ☐
Counting in multiples of 2, 3, 4, 5, 10 from 0. (repeated addition)	   Count the groups as children are counting, children may use their fingers as they are skip counting. Use a range of resources to demonstrate this.	   Number lines, counting sticks and bar modes to show representation of counting in multiples.	Counting in multiples of a number aloud. Write in sequences with multiples of numbers. *'Fill in the missing numbers.'*  3 x 4 = ☐

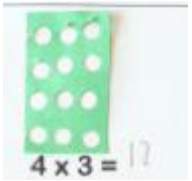
Multiplication

Year 2

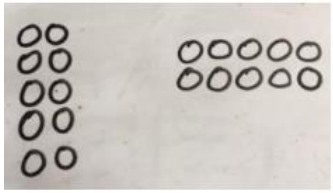
Multiplication is commutative



Children to create arrays using a range of equipment: counters, cubes and Numicon.

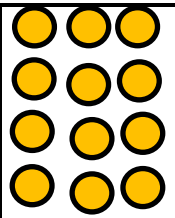


Pupils should understand that an can represent different equations and that, as multiplication is commutative, the order of multiplication does not affect the answer.



Children to represent the arrays pictorially.

Make sure the arrays are drawn in different orientations to find the commutativity.

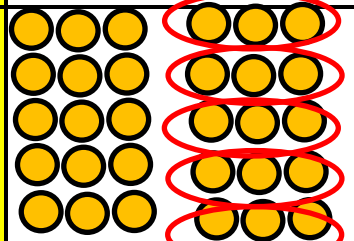


Children to be able to use an array to write multiplication sentences and calculations

3 + 3 + 3 + 3 = 12
4 + 4 + 4=12
4 x 3 = 12
3 x 4 = 12

Using the inverse

This should be taught alongside division, so pupils learn how they work alongside each other.

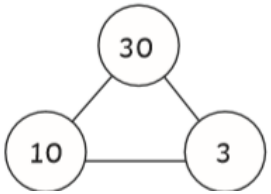


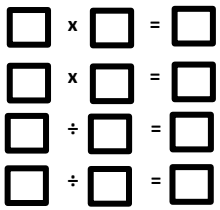
Children to use equipment to build an array.

Children to split the array into equal groups.

15 ÷ 5 = 3

15 ÷ 3 = 5





Using part part whole diagrams to make multiplication and division sentences.

Children to come up with 8 related fact family sentences.

3 x 10 = 30

10 x 3 = 30

30 = 10 x 3

30 = 3 x 10

30 ÷ 3 = 10

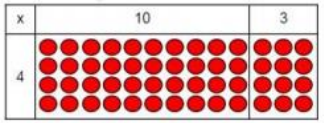
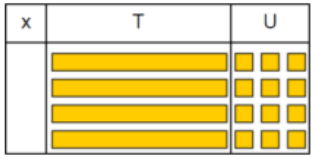
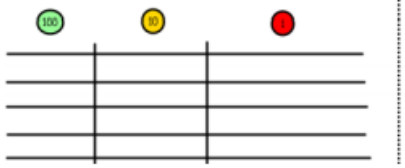
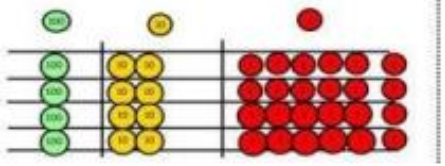
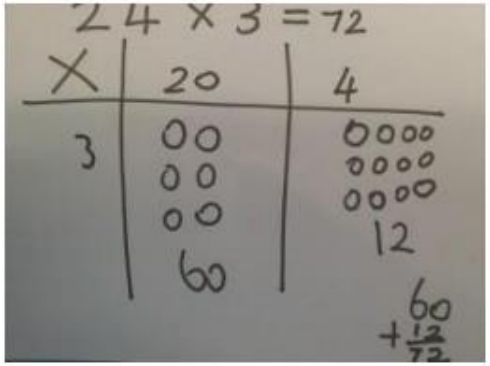
30 ÷ 10 = 3

10 = 30 ÷ 3

3 = 30 ÷ 10

Multiplication

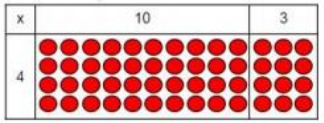
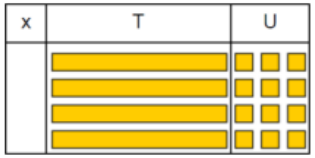
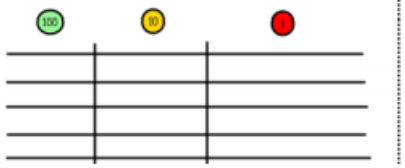
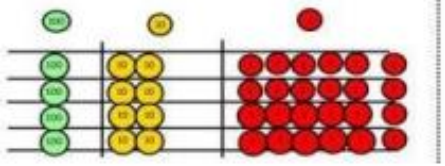
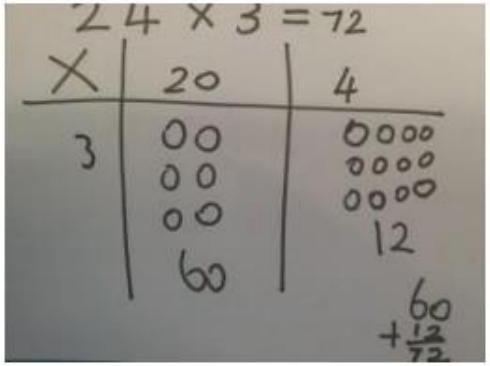
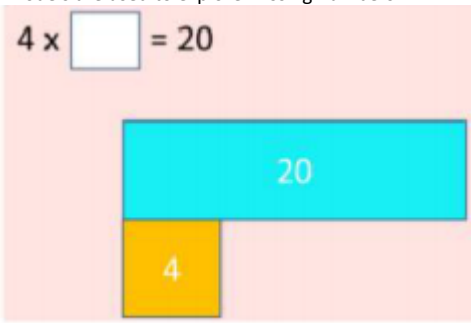
Year 3

Objective and Strategy	Concrete	Pictorial	Abstract
Grid method	Show the link with arrays to first introduce the grid method. 4 rows of 10 4 rows of 3  Move on to using Base 10 to move towards a more compacy method.  Move on to place value counters to show how we are finding groups of a number. We are multiplying by 4 so we need 4 rows.  Fill each row with 126  Add up each column starting with the ones making any exchanges needed. Then you have your answer. 	Children can represent the work they have done with place value counters in a way that they understand. They can draw the counters, using colours to show different amounts or just use circles in the different columns to show their thinking.  	Start with multiplying by one digit numbers and showing the clear addition alongside the grid. **210 + 35 = 245**

×	30	5
7	210	35

Multiplication

Year 3

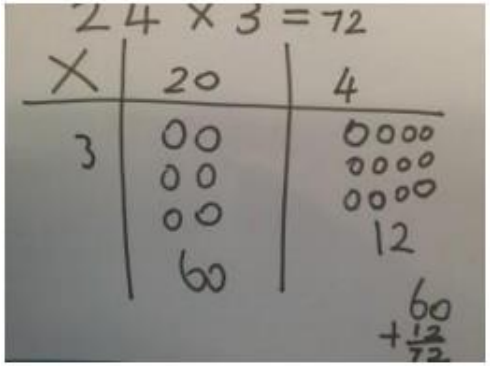
Objective and Strategy	Concrete	Pictorial	Abstract
Grid method	Show the link with arrays to first introduce the grid method. 4 rows of 10 4 rows of 3  Move on to using Base 10 to move towards a more compacy method.  Move on to place value counters to show how we are finding groups of a number. We are multiplying by 4 so we need 4 rows.  Fill each row with 126  Add up each column starting with the ones making any exchanges needed. Then you have your answer. 	Children can represent the work they have done with place value counters in a way that they understand. They can draw the counters, using colours to show different amounts or just use circles in the different columns to show their thinking.  Bar models are used to explore missing numbers  	Start with multiplying by one digit numbers and showing the clear addition alongside the grid.

×	30	5
7	210	35

210 + 35 = 245 |

Multiplication

Year 4

Objective and Strategy	Concrete		Pictorial	Abstract
Grid method recap from year 1 for 2 digits x 1 digit. Move to multiplying 3 digit numbers by 1 digit (Year 4 expectation)	Place-value counter representation of 521 × 3: Step 1 – partition 521: 521 = 500 + 20 + 1 521 = 5 hundreds + 2 tens + 1 one Steps 2 and 3 – gather three sets of 521, multiply the hundreds, tens and ones and recombine:  5 hundreds × 3 = 15 hundreds 2 tens × 3 = 6 tens 1 one × 3 = 3 ones 521 × 3 = 500 × 3 + 20 × 3 + 1 × 3 = 1500 + 60 + 1 Step 4 - regroup the hundreds into thousands and hundreds 15 hundreds = 1 thousand + 5 hundreds 521 × 3 = 1000 + 500 + 60 + 3 = 1563 	Use place value counters or Dienes to introduce the grid method.	Children can represent the work they have done with place value counters in a way that they understand. They can draw the counters, using colours to show different amounts or just use circles in the different columns to show their thinking.  	Start with multiplying by one digit numbers and showing the clear addition alongside the grid. | ×	30	5
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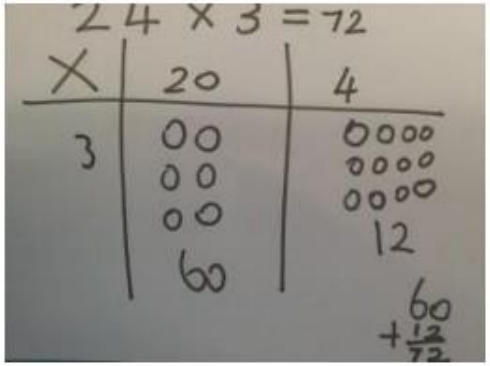
7	210	35	 **210 + 35 = 245**

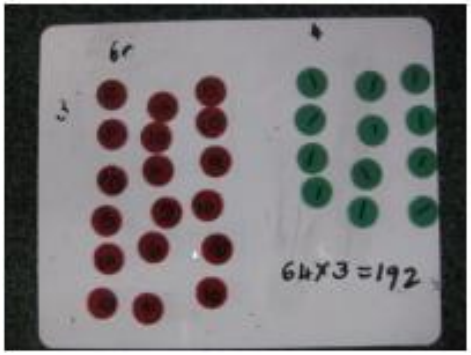
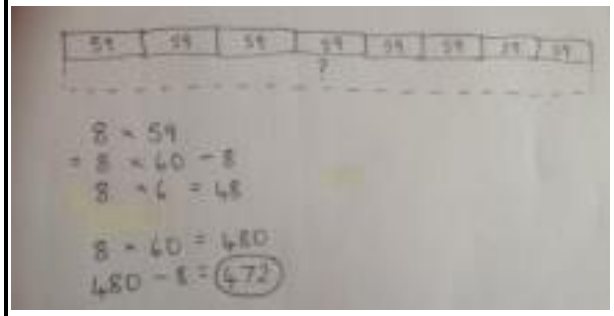
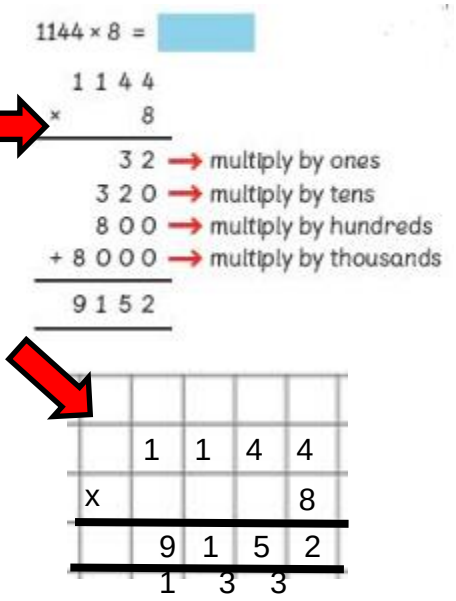
Multiplication

Year 4

Objective and Strategy	Concrete		Pictorial	Abstract
Grid method recap from year 1 for 2 digits x 1 digit. Move to multiplying 3 digit numbers by 1 digit (Year 4 expectation)	Place-value counter representation of 521 × 3: Step 1 – partition 521: 521 = 500 + 20 + 1 521 = 5 hundreds + 2 tens + 1 one Steps 2 and 3 – gather three sets of 521, multiply the hundreds, tens and ones and recombine:  5 hundreds × 3 = 15 hundreds 2 tens × 3 = 6 tens 1 one × 3 = 3 ones 521 × 3 = 500 × 3 + 20 × 3 + 1 × 3 = 1500 + 60 + 1 Step 4 - regroup the hundreds into thousands and hundreds 15 hundreds = 1 thousand + 5 hundreds 521 × 3 = 1000 + 500 + 60 + 3 = 1563 	Use place value counters or Dienes to introduce the grid method.	Children can represent the work they have done with place value counters in a way that they understand. They can draw the counters, using colours to show different amounts or just use circles in the different columns to show their thinking.  	Start with multiplying by one digit numbers and showing the clear addition alongside the grid. | × | 30 | 5 | | 7 | 210 | 35 | 210 + 35 = 245

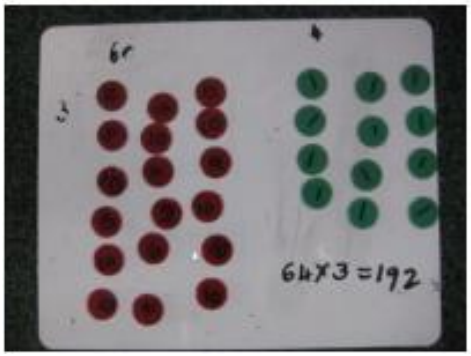
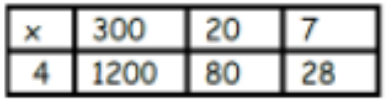
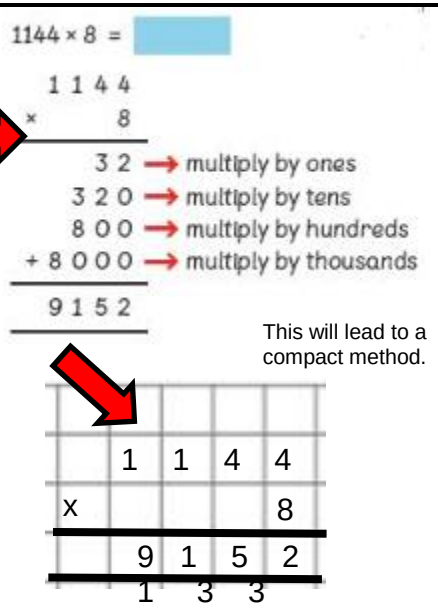
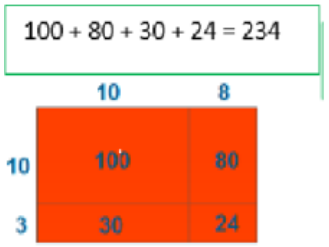
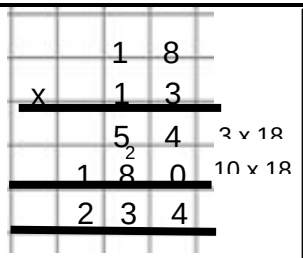
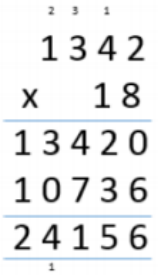
Multiplication

Year 4

Objective and Strategy	Concrete	Pictorial	Abstract
Column multiplication	 Children can continue to be supported by place value counters at the stage of multiplication. This is initially done where there is no regrouping. It is important at this stage that the children multiply the ones first. The corresponding long multiplication alongside of it.	The grid method may be used to show how this relates to formal written method. <table><tr><td>x</td><td>300</td><td>20</td><td>7</td></tr><tr><td>4</td><td>1200</td><td>80</td><td>28</td></tr></table> Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods. 	

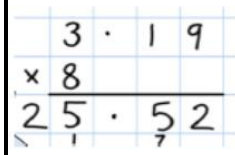
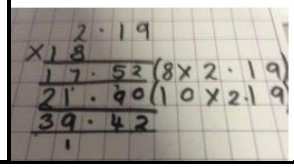
Multiplication

Year 5-6

Objective and Strategy	Concrete	Pictorial	Abstract
Column multiplication for 3 and 4 digits	 Children can continue to be supported by place value counters at the stage of multiplication. This is initially done where there is no regrouping. It is important at this stage that the children multiply the ones first. The corresponding long multiplication alongside of it.	The grid method may be used to show how this relates to formal written method. 	
Column multiplication	Manipulatives may stil be used with the corresponding long multiplication modelled alongside.	 Introduce long multiplication alongside grid method to show the relationship between the answers in each row.	 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 the zero units in first.  1342 x 8 1342 x 10

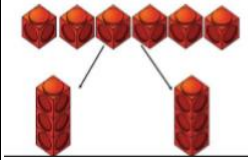
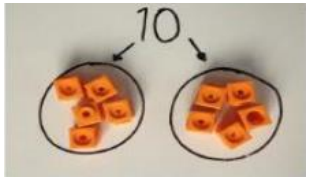
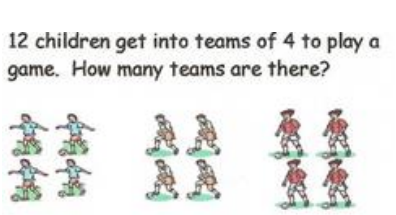
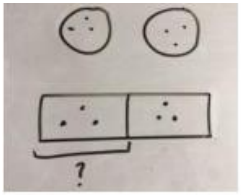
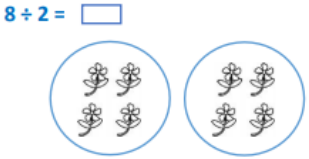
Multiplication

Year 6

Objective and Strategy	Concrete	Pictorial	Abstract
Multiplying decimals up to 2 decimal places by a single digit.	Use place value counters where appropriate if necessary.		Remind children that the single digit belongs in the unit's column. Line up the decimal points in the question and the answer.  

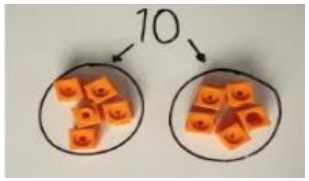
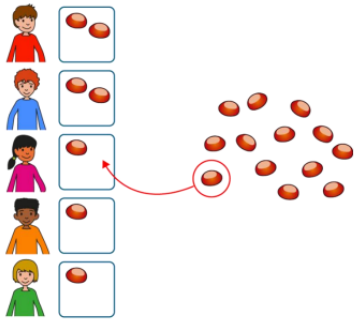
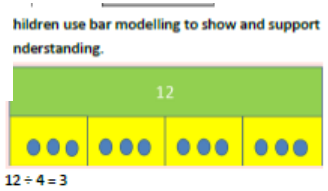
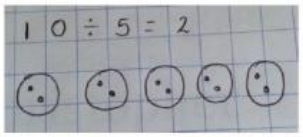
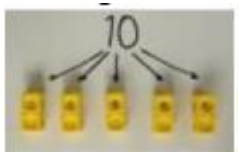
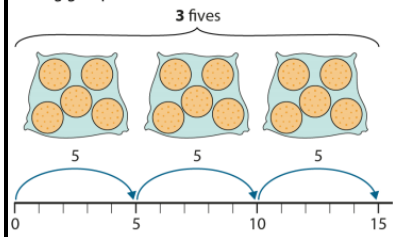
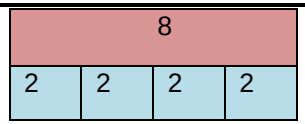
Division

Year 1

Objective and Strategy	Concrete	Pictorial	Abstract
Division as sharing	Use a range of equipment to introduce sharing.  Can you share 6 into two groups?   I have 10 cubes, can you share them equally in 2 groups?	Sharing objects pictorially    6 sweets are shared between 2 people. How many do they each have?  	Share 9 buns between three people. 9 ÷ 3 = 3

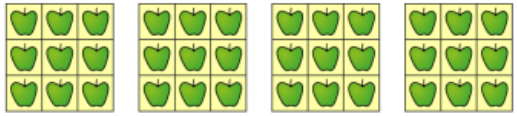
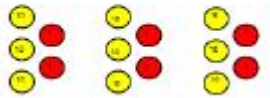
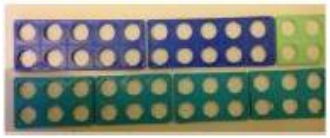
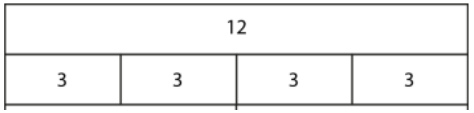
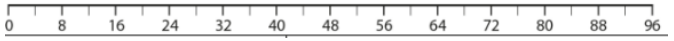
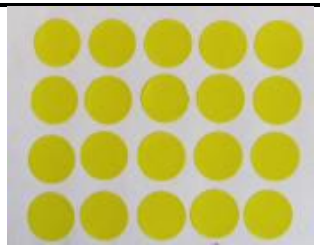
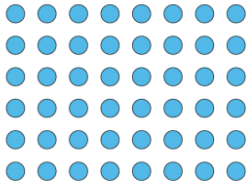
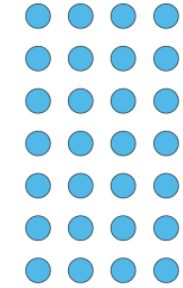
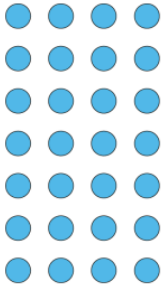
Division

Year 2

Objective and Strategy	Concrete	Pictorial	Abstract
Division as sharing	Use a range of equipment to develop sharing.  Share the 12 cubes equally into the boxes.  I have 10 cubes, can you share them equally in 2 groups?	*'I have twenty conkers, and I share them equally between five children. How many conkers does each child get?'*  Children use pictures or shapes to share quantities. 	12 ÷ 3 = 4
Division as grouping	Divide quanitites into equal groups. Use cubes, counters, objects and place value counters to help understanding.   	 *'There are eight socks. If I put them into pairs, how many pairs will there be?'* Making groups of five:  5 + 5 + 5 = 15 15 ÷ 5 = 3 *'Fifteen divided into groups of five is equal to three.'*  Link images to bar modelling. The bar model to be the whole. Also link number lines for grouping.	28 ÷ 7 = 4 Divide 28 into 7 groups. How many are in each group? Max is filling party bags with sweets. He has 20 sweets altogether and decides to put 5 in every bag. How many bags can he fill?

Division

Year 3

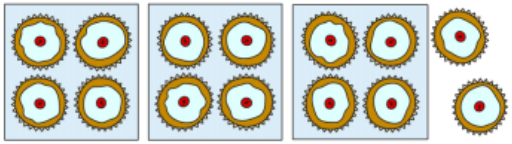
Objective and Strategy	Concrete	Pictorial	Abstract
Division as grouping	 36 can be divided into 4 groups = 9 96 ÷ 3 = 32  Use cubes, counters, objects or place value counters to aid understanding.  24 can be divided into groups of 6 = 4	 Use bar modelling to help understanding of grouping. Missing-number sequences/problems: *'Fill in the missing numbers.'* 0 | 4 | 8 | 12 | 16 | | | | | | | | Use missing-number sequences to build up grouping. Number line:  0 8 16 24 32 40 48 56 64 72 80 88 96 Use number lines to aid division problems. 'How many groups of 8 in 72?'	How many groups of 8 in 32? 32 ÷ 8 = 4
Division with arrays	 Link division to multiplication with arrays and think about the number sentences that can be created. 20 ÷ 4 = 5 20 ÷ 5 = 4 5 x 4 = 20 4 x 5 = 20	Draw an area and use lines to split them up into groups. Make division and multiplication sentences from them. Array problem:  • *'How many groups of six are there?'* □ × 6 = □ • *'How many groups of three are there?'* □ × 3 = □ *'Circle the groups of four and complete the sentence.'*  There are ___ groups of four. *'Circle the four equal groups and complete the sentence.'*  There are four groups of ___.	Find the inverse of multiplication and division sentences. *'Fill in the missing numbers.'* 3 × 4 = □ 5 × 4 = □ 4 × 3 = □ □ × 4 = 20 12 ÷ 4 = □ 20 ÷ 4 = □ *'What multiplication fact can be used to solve this division calculation?'* 24 ÷ 4 = ? I can use this multiplication fact: ___ × ___ = ____

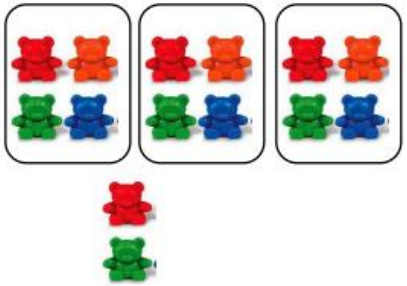
Division

Year 3

Division with remainders

'A baker has fourteen cakes. He sells cakes in boxes of four. How can he box the cakes?'

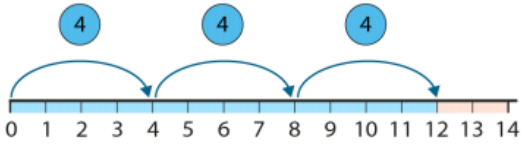




14 ÷ 3 = 4 r 2

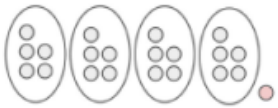
Use objects between groups and see how much is left over.

'A baker has fourteen cakes. He sells cakes in boxes of four. How can he box the cakes?'



Use a number line to jump equally. Then you will see how many more you need to jump to find the remainder.

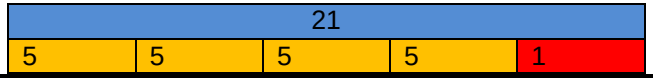
- *'One box of four is four.'*
- *'Two boxes of four are eight.'*
- *'Three boxes of four are twelve.'*
- *'There are two cakes left over.'*



21 ÷ 5 = 4 r 1

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

Use bar models to show division with remainders



Complete written divisions and show remainders using r.

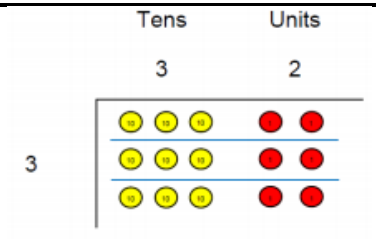
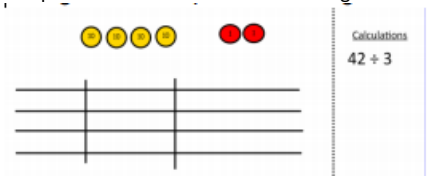
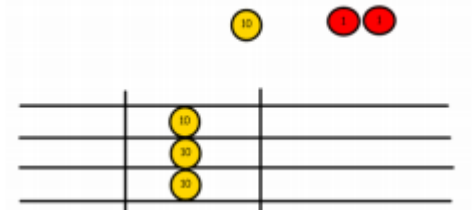
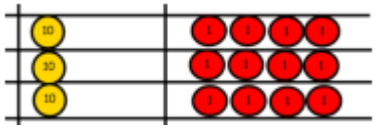
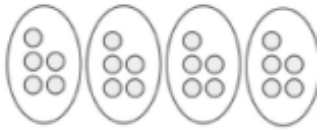
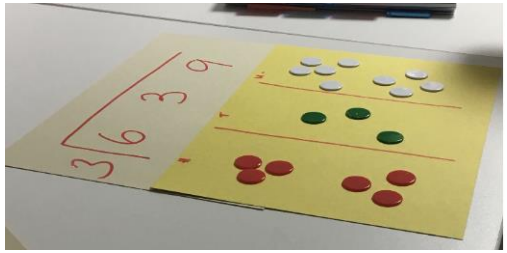
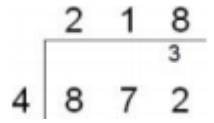
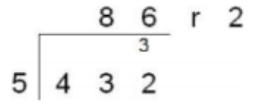
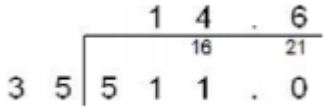
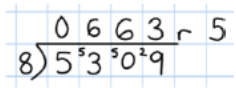
14	÷	4	=	3	r	2
dividend	÷	divisor	=	quotient	r	remainder

22 ÷ 4 = ☐ r ☐

23 ÷ 4 = ☐ r ☐

Division

Years 4-6

Objective and Strategy	Concrete	Pictorial	Abstract
Divide at least 3 digit numbers by 1 digit. Short division.	 96 ÷ 3 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.	Children can continue to draw diagrams with dots or circle and circle to help them to divide into equal groups.  Encourage children to move towards counting multiples to divide more efficiently. 	Begin with divisions that divide equally with no remainder.  Move onto division with a remainder.  Finally move into decimal places to divide the total accurately.  

Division

Year 6

Long division	Start with a remainder in the ones.

```
        1 4 . 6
      ---------
3 5 | 5 1 1 . 0
      16  21
```

```
    h t o
    0 4 1 R1
  ----------
4 ) 1 6 5
```

4 does not go into 1 (hundred). So combine the 1 hundred with the 6 tens (160).

4 goes into 16 four times.

4 goes into 5 once, leaving a remainder of 1.

```
     th h t o
     0 4 0 0 R7
   -------------
8 ) 3 2 0 7
```

8 does not go into 3 of the thousands. So combine the 3 thousands with the 2 hundreds (3,200).

8 goes into 32 four times (3,200 ÷ 8 = 400)
8 goes into 0 zero times (tens).
8 goes into 7 zero times, and leaves a remainder of 7.

```
    h t o
    0 6 1
  ----------
4 ) 2 4 7
    - 4
      3
```

When dividing the ones, 4 goes into 7 one time. Multiply 1 × 4 = 4, write that four under the 7, and subract. This finds us the remainder of 3.

Check: 4 × 61 + 3 = 247

```
     th h t o
     0 4 0 2
   -----------
4 ) 1 6 0 9
     - 8
       1
```

When dividing the ones, 4 goes into 9 two times. Multiply 2 × 4 = 8, write that eight under the 9, and subract. This finds us the remainder of 1.

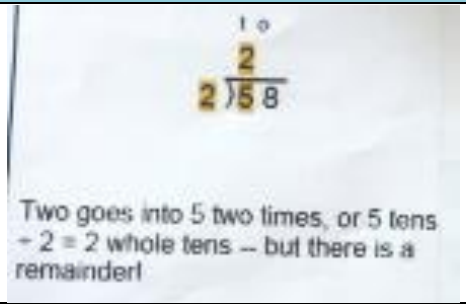
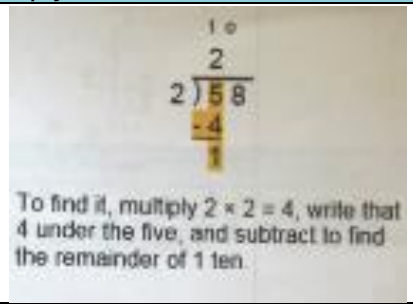
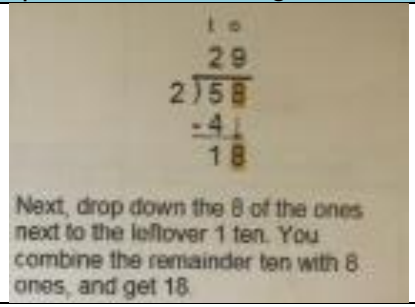
Check: 4 × 402 + 1 = 1,609

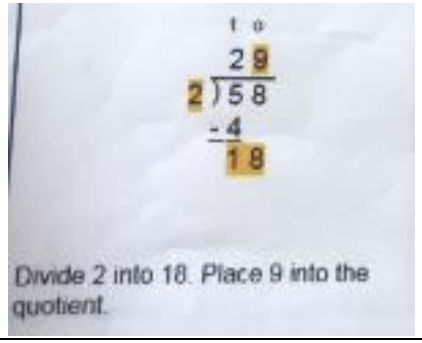
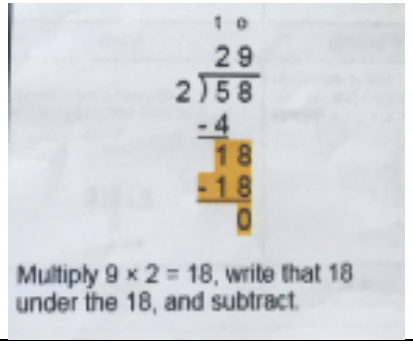
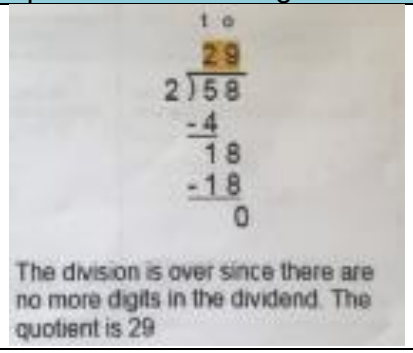
Division

Year 6

Long division

Step 2 – a remainder in the tens.

1. Divide	2. Multiply and Subtract	3. Drop down the next digit.
		

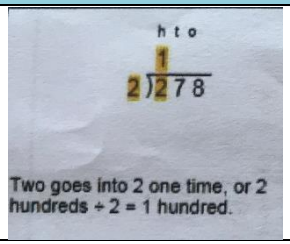
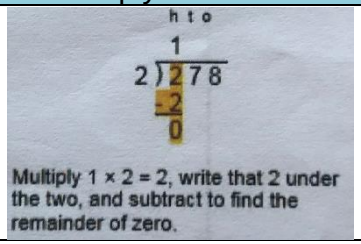
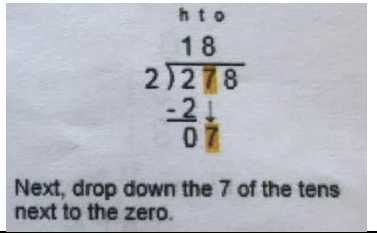
1. Divide	2. Multiply and Subtract	3. Drop down the next digit.
		

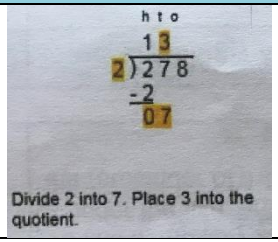
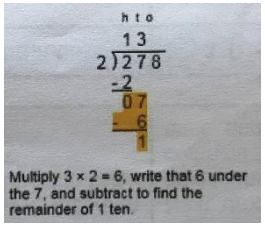
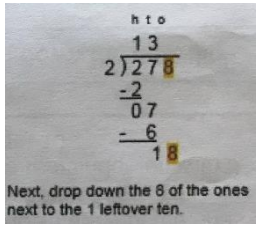
Division

Year 6

Long division

Step 2 – a remainder in any of the place values

1. Divide	2. Multiply and Subtract	3. Drop down the next digit.
		

4. Divide	5. Multiply and Subtract	6. Drop down the next digit.
		

7. Divide	8. Multiply and Subtract	9. Drop down the next digit.