Tealby Primary School

Aspire, Believe, Achieve

ETHOS STATEMENT

It is the aim of Tealby Primary School to develop policies and procedures which support the school's vision:

We want our pupils to move from us, confident, curious, articulate, creative, independent and well-prepared for their next stage. We want to produce collaborators, innovators, leaders and, more than anything else, young people who understand what it is to be human.

Tealby Primary School – Maths Calculations Progression and Guidance

February 2024

This calculation progression and guidance reflects the methods taught pictorially, concretely and abstractly to the maths National Curriculum objectives (2014) and the Early Years Framework (2021). Teachers should use this as a resource to help with their planning as well as guiding children to build and develop their mathematical skills and methods.

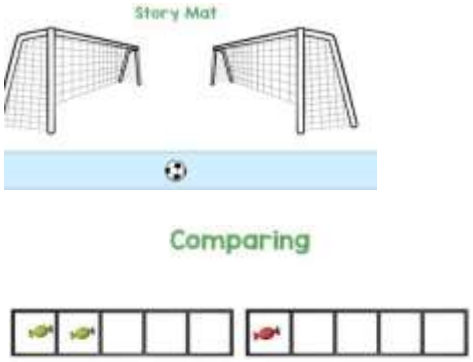
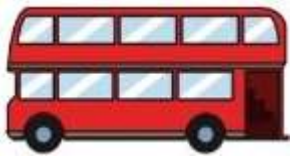
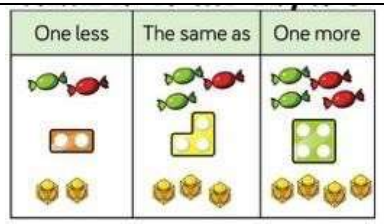
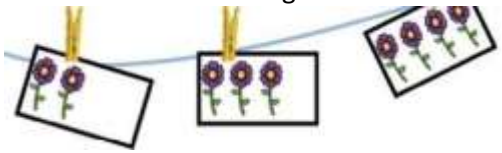
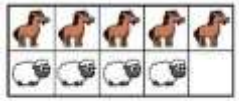
Addition

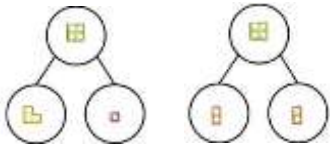
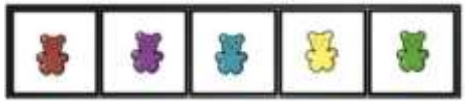
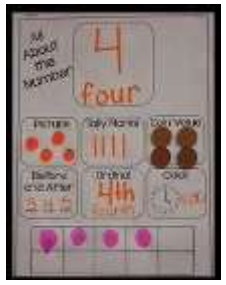
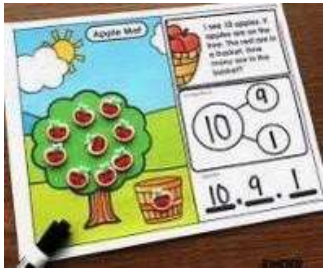
EYFS

Objective and Strategy	**Concrete**	**Pictorial**	**Abstract**
Experiment with own symbols and marks, including numbers	Provide concrete resources to explore number symbols and quantities. 	 Play games that introduce children to number symbols.	  Encourage children to record their own symbols and marks and to explain them.
Solve real world mathematical problems with numbers up to five.	 Play games that lend themselves to mathematical problems. 'How many skittles are left standing?'	 Make visual, practical displays showing different ways of making numbers to 6 so that children can investigate these. Have a sustained focus on each number to 6.	
Compare quantities using language: 'more than'.	Support children to solve problems using fingers and objects. 'There are four of you, but there aren't enough bears'. How many more bears do we need? 	Draw attention to differences and changes in amounts through stories - The Enormous Turnip, Mouse Count.  Provide resources for children to explore quantities.	Discuss mathematical ideas. 'I think Adam has more crackers…' 'I have 3, who has more counters than me?' 'Let's add one more fish, now we have two' 

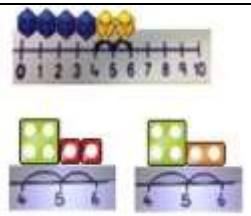
Addition

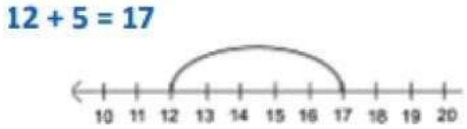
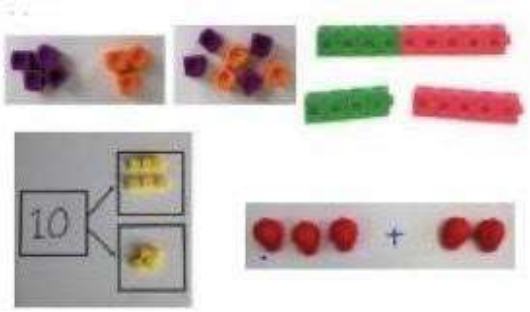
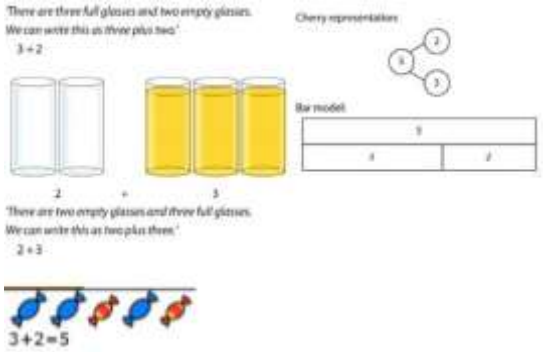
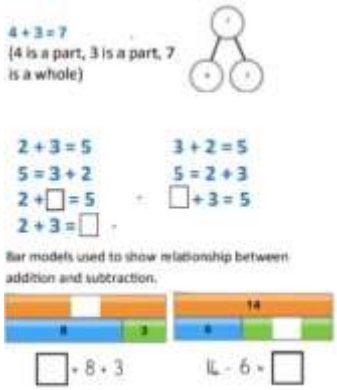
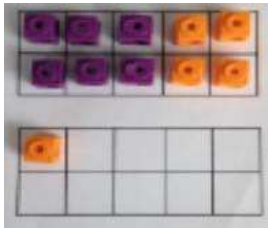
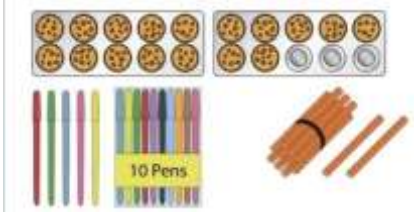
EYFS YEAR R

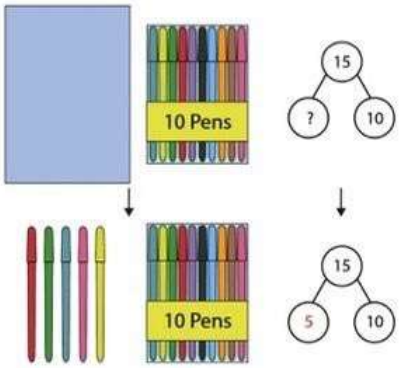
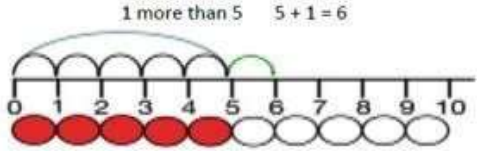
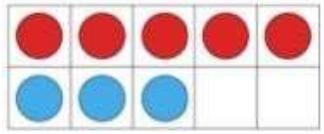
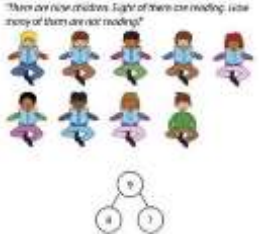
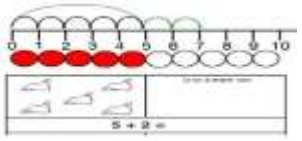
Compare quantities using language: 'more than', 'the same as', 'equal'.	Provide a range of collections to compare, starting with a very different number of things. Include 'more' small things and 'fewer' large things, spread them out and bunch them up, to draw attention to the number not the size of things or the space they take up. 	Use pictures to compare quantities. 	Distribute items evenly, eg: put 3 in each bag, give each child 2 objects. Make deliberate mistakes in order to provoke discussion. Tell a story of a character distributing snacks unfairly and invite a child to make sure everyone has the same.
Understand 'one more than' relationship between consecutive numbers.	Use concrete resources to add one more.  2 on the bus one more makes 3 on the bus.		Hide a card and for the children to work out which one is missing.  Children to explain choice, for example 3 is missing because it is 1 more than 2.
Explore the composition of numbers to 10. Including double facts	Focus on composition of numbers to 5 before moving onto larger numbers. Use cubes, counters, objects of interest to add two sets together as a group.  3 bees and 1 ant. How many altogether? 	Provide a range of visual models of numbers: for example, six as double three birds on the tree.  Using pictures to add two numbers together as a group. Model conceptual subitising: 'well, there are 3 on this branch and three here, so there must be 6'.	 There are ☐ horses. There are ☐ sheep. There are ☐ animals altogether.

Combining two parts to make a whole: emphasizing the parts.	Use stories and concrete resources to emphasis an understanding of the parts within the whole: 'Well there were eight bananas altogether. Two were eaten and six were not.  Plan games which involve partitioning and recombining sets. For example, kick 5 footballs, aiming for the goal. How many go in and how many don't?	Provide a range of visual models of part whole to develop understanding - as above.	Develop an understanding of parts adding up to a whole using models such as 5 frames, 10 frames, part whole. 
Automatically recall number bonds for numbers 0-10.	Make amounts using concrete resources. Use models including; part whole, 5 frames, 10 frames, Numicon, dominoes.   	Have a sustained focus on each number to 10.  Make visual, practical displays showing different ways of making numbers to 10 so that children can refer to these. 	Children solve problems relating to number bonds for numbers 0-10. 

Addition **YEAR 1**

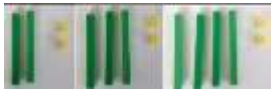
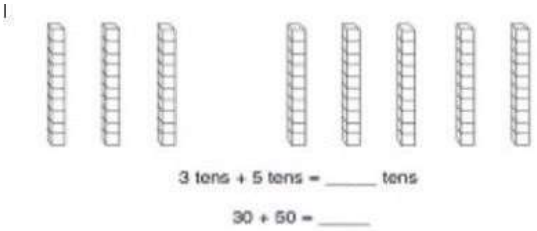
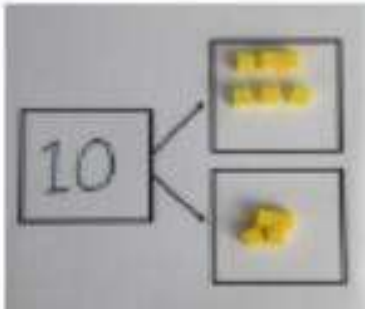
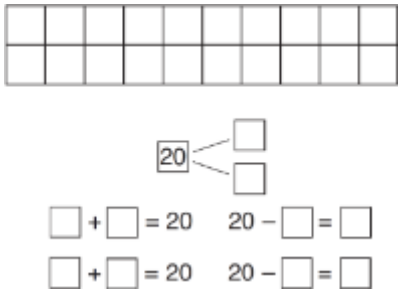
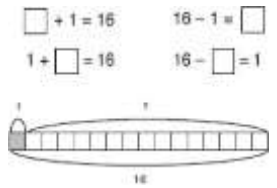
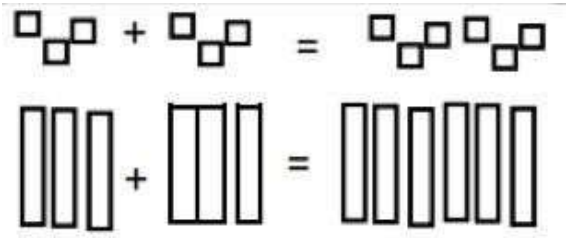
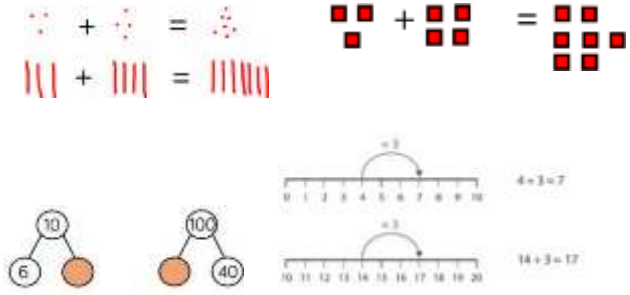
Objective and Strategy	Concrete	Pictorial	Abstract
Counting on adding small amounts with an understanding that counting on from the biggest number is the most	 Counting on using number lines and concrete resources.	Use a number line to count on in ones or in one jump to find the answer. Starting at the larger number on the number line.  	5+12= Place the larger number in your head and count on the smaller number to find the answer. Counting on using twos. The abstract number line: What is 2 more than 4?

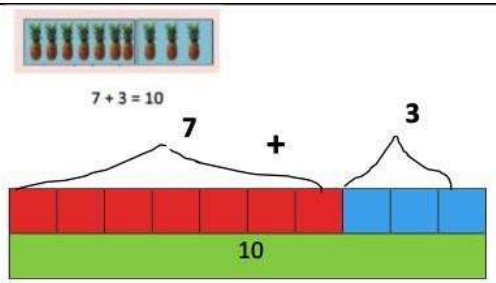
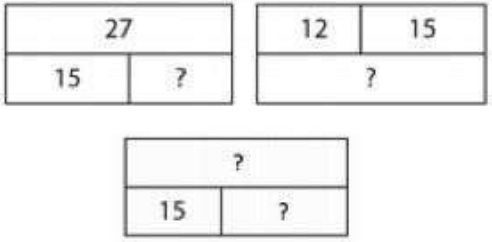
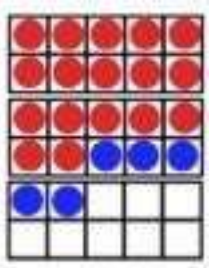
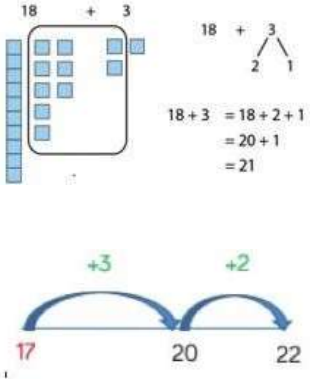
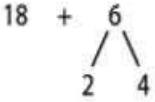
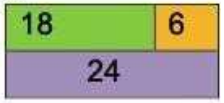
efficient strategy.	  Start with the larger number on the bead string and count on to find the smaller number,1 by 1 to find		What is the sum of 2 and 4? What is the total of 4 and 2? 4 + 2 
Combining two parts to make a whole: part-whole model	Use part part whole mr Use cubes to add two numbers together as a group or in a bar. 	Using pictures to add two numbers together as a group or in a bar. 	
Regrouping to make ten.	‘Make ten’ using tens frames and concrete resources. Start with the greater number and then add the smaller number.  	Using pictures of objects and regroup or partition the smaller number to make 10. Starting to apply tens and ones. 	Developing an understanding of grouping ten and applying this into a part part whole model or into equations to develop equality.

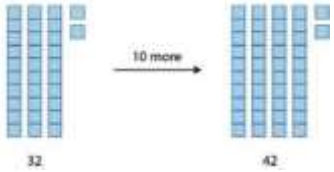
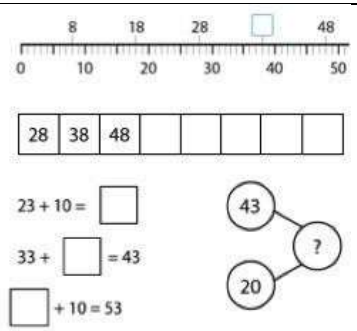
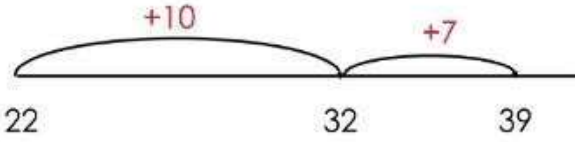
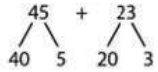
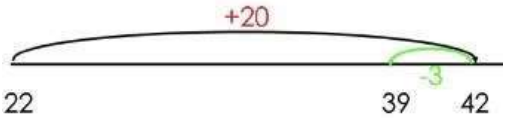
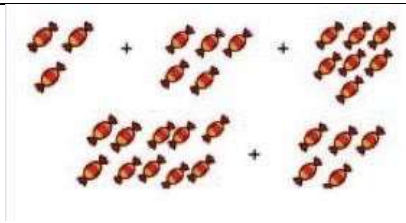
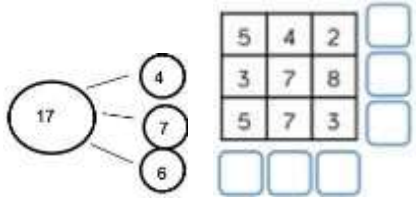
		Ten ones are visible:  10s: 1 | 1s: 5 *'The 1 means one ten, and the 5 means five ones.'*	*'Sara has fifteen pens. How many are hidden?'*  Missing addend equations: □ + 10 = 15 19 = 10 + □ □ + 3 = 13 11 = 1 + □
Adding 1, 2, 3 more. Overtime, pupils should be encouraged to rely on their number bonds rather than counting strategies.	  	Emphasis should be on language: 1 more than… 	□ + 6 = 9 3 more than 6 is 9 6 + 3 = □ 3 less than 4, so 6 plus 3 is 1 less than 10
Represent and use number bonds and related subtraction facts within 20.	Teach both addition and subtraction so that pupils begin to identify inverse relationships.  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 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 less than 4, so 6 plus 3 is 1 less than 10

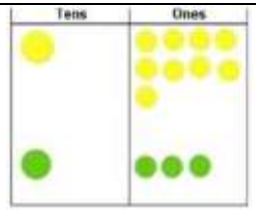
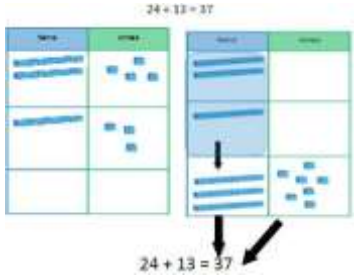
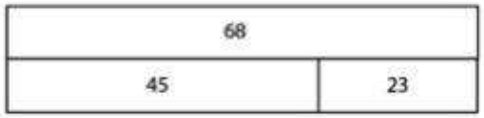
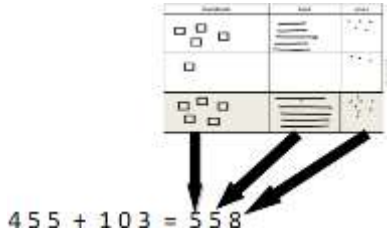
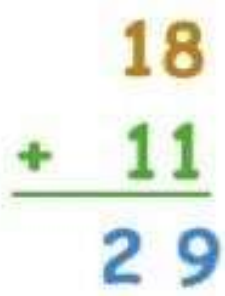
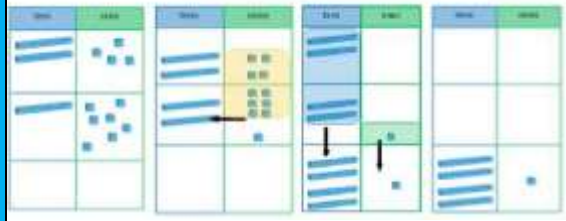
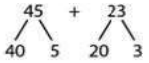
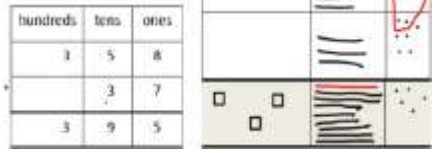
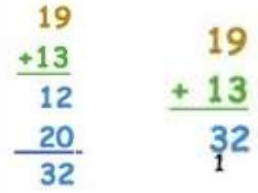
Addition

YEAR 2

Counting on in multiples of 10.	Using dienes and bead strings to represent multiples of 10.  50=30+20  Counting on with 10s and 1s  Using Numicon to represent 10. 60=10+10+10+10+10+10	Use pictorial representations for base 10.  3 tens + 5 tens = _____ tens 30 + 50 = _____	20 + 30 = 50 70 = 50 + 20 40 + □ = 60
Using known number facts to 20. Part, part, whole	Children explore ways of making numbers within 20.  	 	20 = 17 + 3 20 = 3 + 17 20 − 3 = 17 20 − 17 = 3 
Using known number facts to understand derived facts - up to 100.	Children explore ways of 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		 15 + 12 = 27
Adding a two-digit number and ones Make 10 strategy	Continue to develop an understand partitioning and place value.  17 + 5 = 22 Use a 10 frame to make a ‘magic 10’. 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 

Adding a two-digit number and a tens number.	 Explore that the ones digit does not change. 17 + 10 = 27	Using Dienes pictures  *We had 3 tens and 2 ones. Ten more gives us 4 tens and 2 ones.* Use number squares  *'Ten more than forty-two is fifty-two'*	 27 + 10 = 37 27 + 20 = 47 27 + □ = 57
Adding two two-digit numbers. Partitioning a number into 10s and 1s.	Model using Dienes, place value counters, Numicon and bead strings. 	Use number lines to bridge 10. Use part, part, whole where necessary.  22 + 17 = 39	 40 + 20 = 60 5 + 3 = 8 60 + 8 = 68 Partitioning into 10s and 1s.
Adding two two-digit numbers. Round and adjust (compensation strategy)		 Adding 20 and subtracting 3 is easier than trying to add 17. This is addition by compensation.	22 + 17 = 39
Adding 3 single-digit numbers.	**4 + 7 + 6 = 17** Put 4 and 6 together to make 10. Add on 7. 		Combine the 6 + 4 to make 10, then adding the 7. 

	 Combine to make 10 first if possible, or bridge 10 then add third digit	Add 3 groups together. Draw a picture to recombine the groups to make 10.	
Introducing column addition - no grouping.	 Use place value counters and Dienes to provide support. 	Use the bar model to represent the calculation.  	Introduce expanded method without exchanging. 
Introducing column addition - grouping.	24 + 17 	 40 + 20 = 60 5 + 3 = 8 60 + 8 = 68 First partition into 10s and 1s, regroup where required. Add the 10s. Add the 1s. Then add the 10s and 1s. 	Introduce expanded method by regrouping without exchanging. Then move onto exchanging with 10s and 1s. 

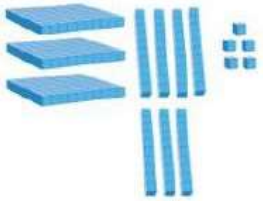
Addition

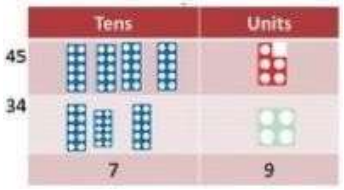
Year 3

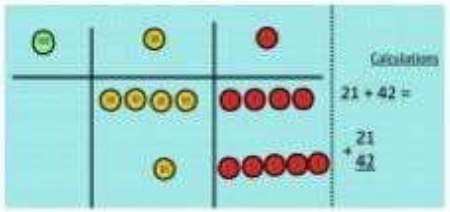
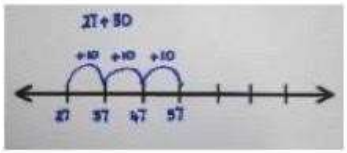
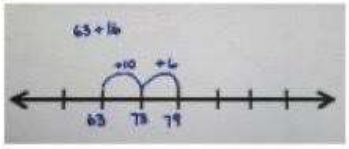
<table>
<tr>
<td>Add numbers mentally, including:

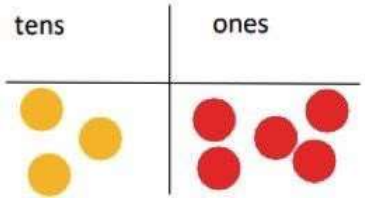
a three-digit number and ones;

a three-digit number and tens;

a three-digit number and hundreds</td>
<td> 
Model using Dienes or Numicon.

 
Add together the ones first then the tens.

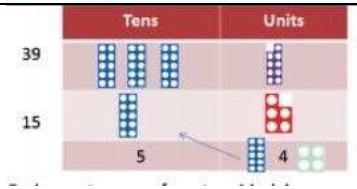
 
Move to using place value counters.</td>
<td> 
 
Using number lines.

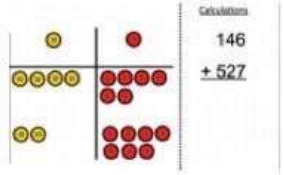
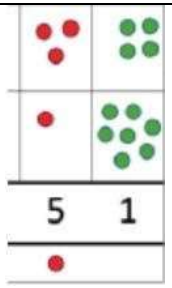
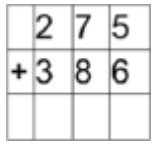
 
Pupils move to drawing counters using a frame - H T O</td>
<td>2 2 3
+ 1 1 4
3 3 7

<u>No regrouping</u>

345 + 30 274 - 50

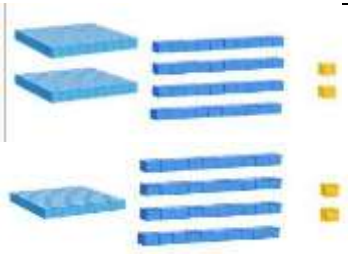
1128 + 300 1312 - 300

326 + 342 856 - 724</td>
</tr>
<tr>
<td>Column addition for calculations up to 4 digits that require regrouping</td>
<td> 
Exchange ten ones for a ten. Model using Numicon and place value counters.

  </td>
<td> 
To further support children's understanding they can draw a representation of the grid. Carrying the one underneath the line.</td>
<td> 
<u>With some regrouping</u>

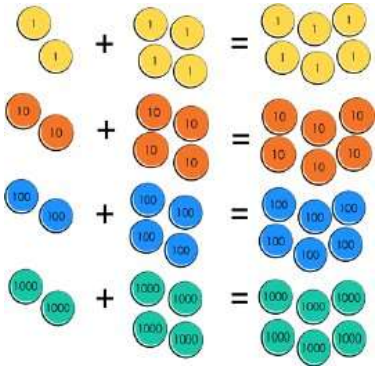
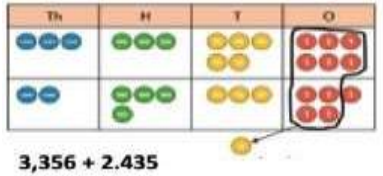
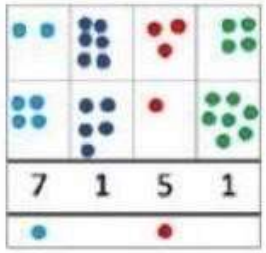
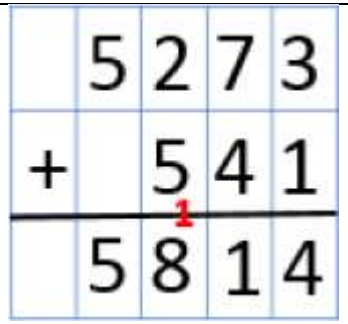
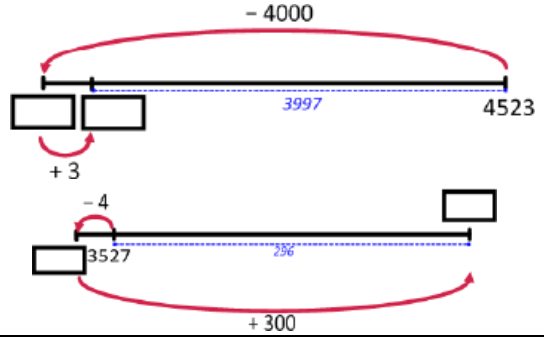
416 + 25 232 - 5

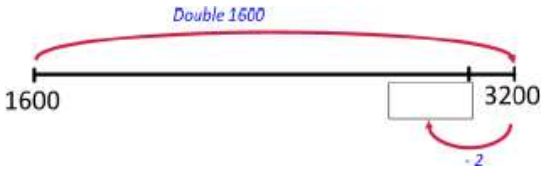
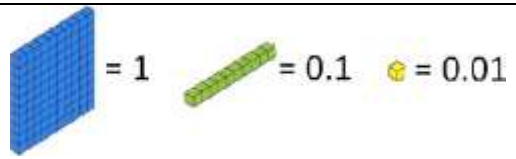
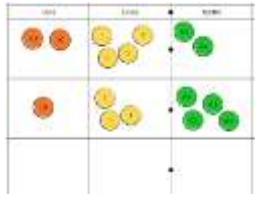
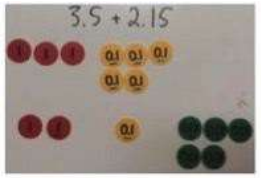
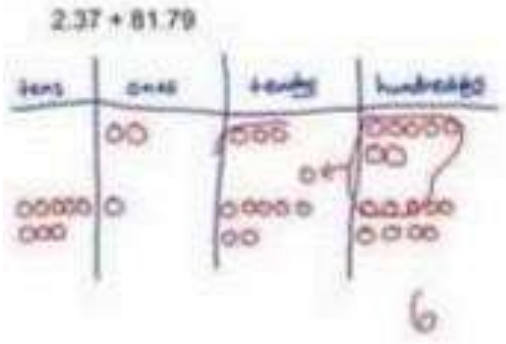
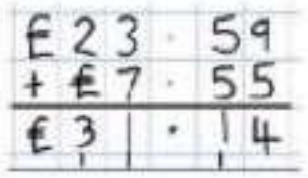
383 + 130 455 - 216

611 + 194 130 - 40</td>
</tr>
<tr>
<td>Find 10 or 100 more or less than a given number</td>
<td>  </td>
<td></td>
<td>142 + 100 = 242</td>
</tr>
</table>

Addition

Year 4

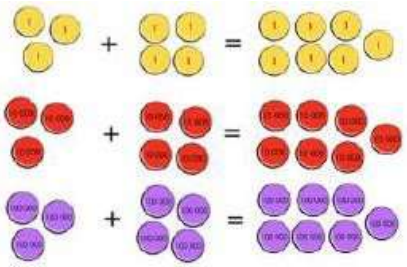
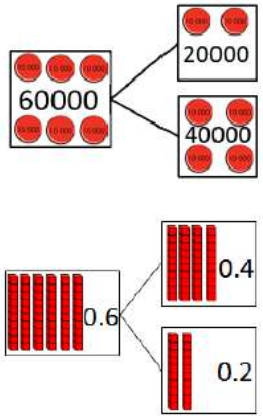
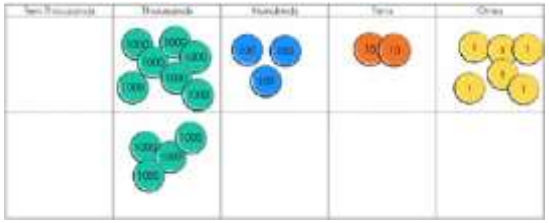
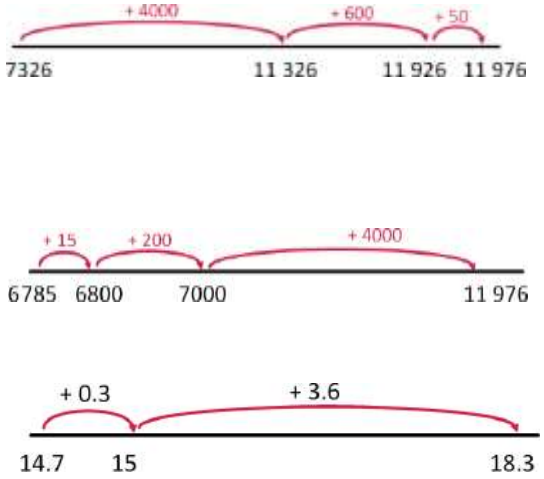
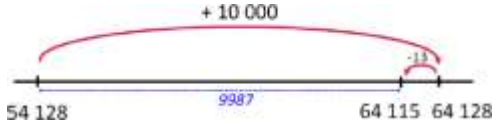
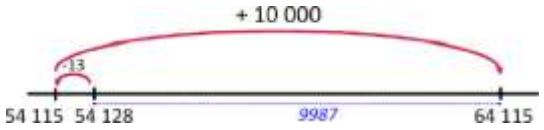
Count forwards or backwards in steps of 10, 100, and 1000.			E.g. 990 + 10 or 19.9 + 0.1
Using known facts and knowledge of place value to derive facts. Add and subtract multiples of 10, 100 and 1000 mentally.			2 + 4 = 6 20 + 40 = 60 200 + 400 = 600 2000 + 4000 = 6000
Written column methods for addition		 To further support children's understanding they can draw a representation of the grid. Carrying the one underneath the line.	
Round and adjust	Children continue to use Dienes or place value counters to add, exchanging 10 ones for a ten, 10 tens for a hundred and so on.		3527 + 296 = 3827 - 4 3527 + 296 = 3523 + 300 4523 – 3997 = 523 + 3

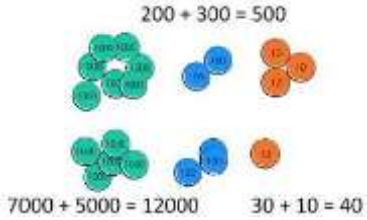
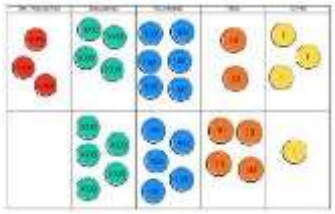
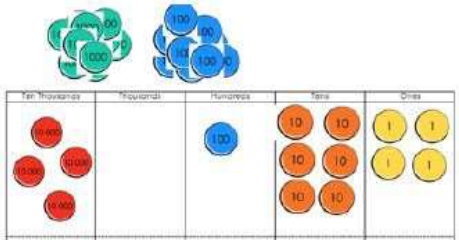
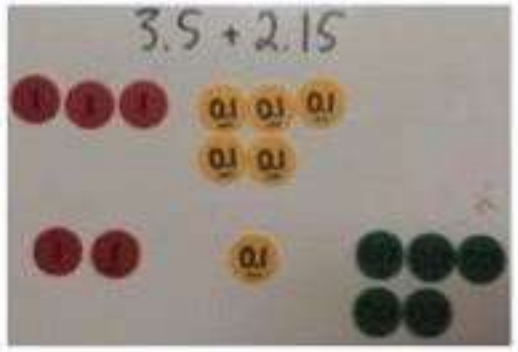
Near doubles			1600 + 1598 = double 1600 – 2
Calculating with decimal numbers	 Introduce decimal place value counters and model exchange for addition.  		24.2 + 13.4 = 72.8 + 54.6 127.4 1 1 

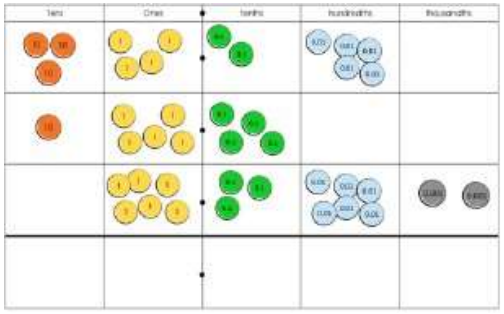
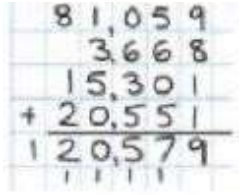
Addition

Year 5 & 6

Count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000	Support with place value counters on a place value chart, repeatedly adding the same counter and regrouping as needed.  Counting sticks and number lines: 	 Pay particular attention to boundaries where regrouping happens more than once and so more than one-digit changes. e.g. 9900 + 100 = 10 000 or 99 000 + 1000 = 100 000	

Using known facts and understanding of place value to derive.			3 + 4 = 7 30 000 + 40 000 = 70 000 300 000 + 400 000 = 700 000 20 000 + 40 000 = 60 000 40 000 + 20 000 = 60 000 60 000 - 40 000 = 20 000 60 000 - 20 000 = 40 000 0.6 = 0.2 + 0.4 0.6 = 0.4 + 0.2 0.2 = 0.6 - 0.4 0.4 = 0.6 - 0.2
Partitioning one number and applying known facts to add. Using canonical and non-canonical methods.	 With place value counters, represent the larger number and then add each place value part of the other number. The image above shows the thousands being added.		4650 + 7326 = 7326 + 4000 + 600 + 50 Extend the ‘Make ten’ strategy (see guidance in Y1 or Y2) to count on to a multiple of 10 e.g. 6785 + 2325 = 6785 + 15 + 200 + 2110 The strategy can be used with decimal numbers, Make one: 14.7 + 3.6 = 14.7 + 0.3 + 3.3 = 15 + 3.3
Round and adjust using compensation		 Pupils should realise that they can adjust first: 	54 128 + 9987 = 54 128 + 10 000 – 13 = 64128 – 13 54128 + 9987 = 54128 – 13 + 10 000 = 54 115 + 10 000

Near doubles			160 + 170 = double 150 + 10 + 20 160 + 170 = double 160 + 10 or 160 + 170 = double 170 – 10 2.5 + 2.6 = double 2.5 + 0.1
Partition both numbers and combine the parts	 Pupils should be aware that the parts can be added in any order.		7230 + 5310 = 12 000 + 500 + 40
Written column methods for addition	For this method start with the digit of least value because if regrouping happens it will affect the digits of greater value.  Combine the counters in each column and regroup as needed: 		3 4 6 2 3 + 5 5 4 1

Add several numbers of increasing complexity. Including adding money, measures and decimals with different numbers of decimal points.			 Insert zeros for place holders 

Subtraction

EYFS

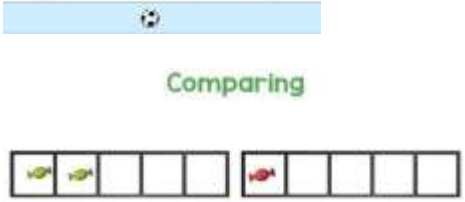
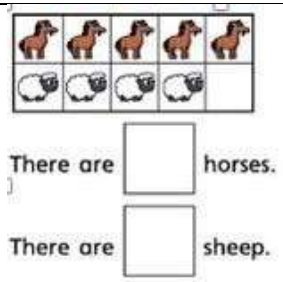
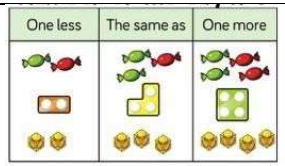
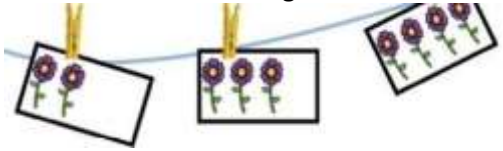
Experiment with own symbols and marks, including numbers	Provide concrete resources to explore number symbols and quantities. 	 Play games that introduce children to number symbols.	  Encourage children to record their own symbols and marks and to explain them.
Solve real world mathematical problems with numbers up to five.	 Play games that lend themselves to mathematical problems. 'How many skittles have you managed to knock down?'	 Make visual, practical displays showing different ways of making numbers to 5 so that children can investigate these. Have a sustained focus on each number to 5.	Recite numbers past 5.

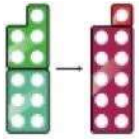
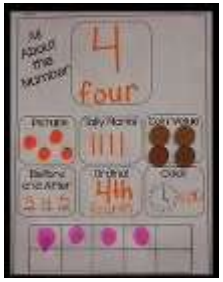
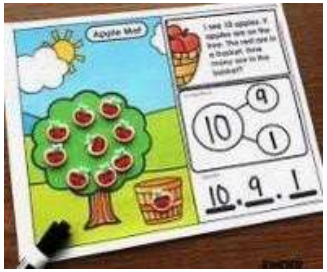
Compare quantities using language: 'fewer than'.	Support children to solve problems using fingers and objects. 'There are four of you, do we have more of fewer bears. 	Draw attention to differences and changes in amounts through stories - The Enormous Turnip, Mouse Count.  Provide resources for children to explore quantities.	Discuss mathematical ideas. 'I think Adam has fewer crackers…' 'I have 3, who has fewer counters than me?' 'Let's take a fish, now we have fewer, we have two' 

Subtraction

EYFS

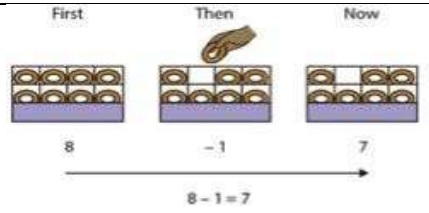
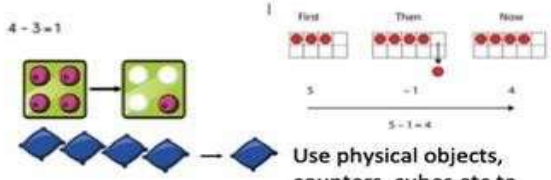
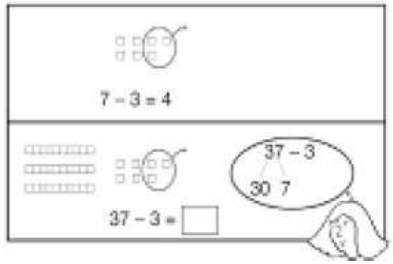
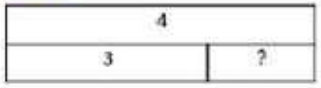
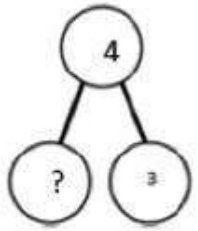
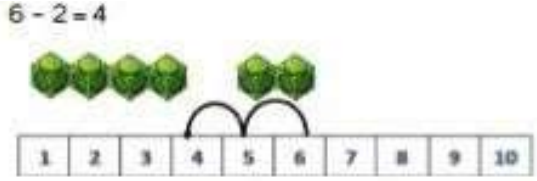
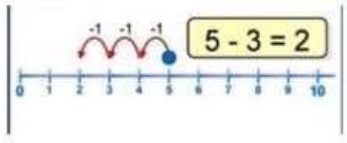
Year R

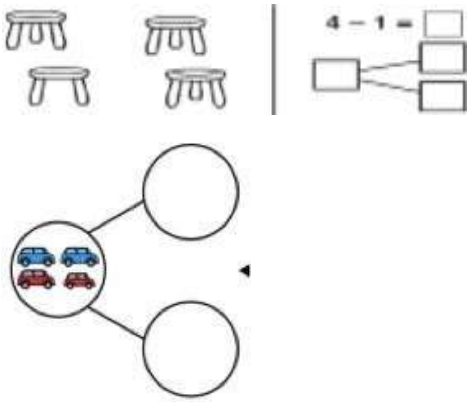
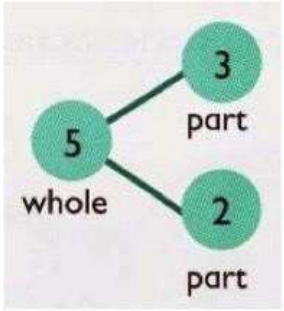
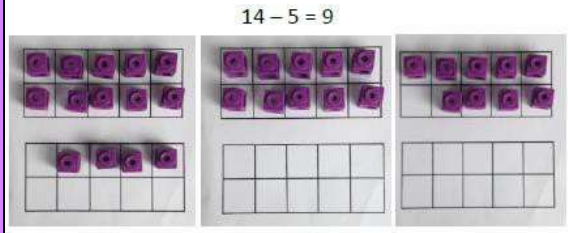
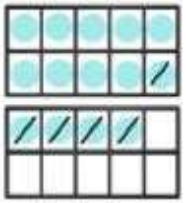
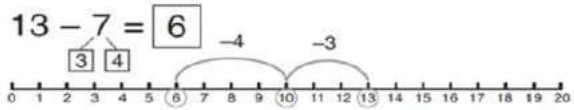
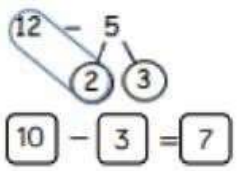
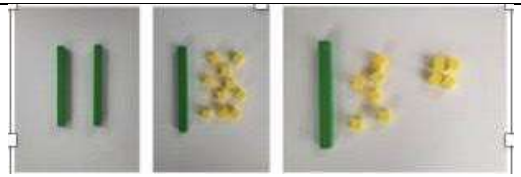
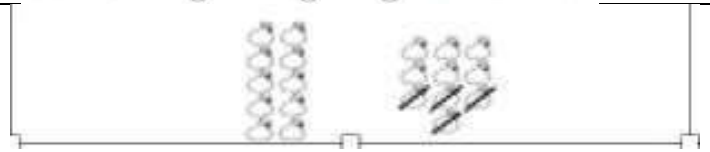
Compare quantities using language: 'fewer than', 'the same as', 'equal'.	Provide a range of collections to compare, starting with a very different number of things. Include 'more' small things and 'fewer' large things, spread them out and bunch them up, to draw attention to the number not the size of things or the space they take up. 	Use pictures to make direct comparison of quantity.   	 Are there fewer horses or fewer sheep?
Understand 'one fewer than' relationship between consecutive numbers.	Use concrete resources to take one away.  3 on the bus one gets off, leaving 2 on the bus.	 Focus on language of one fewer.	Hide a card and for the children to work out which one is missing.  Children to explain choice, for example 3 is missing because it is 1 fewer than 4.

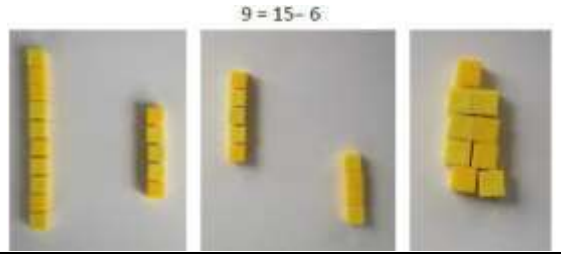
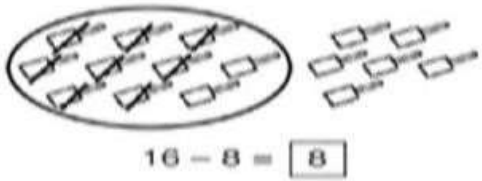
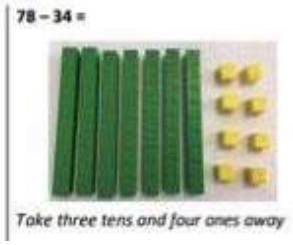
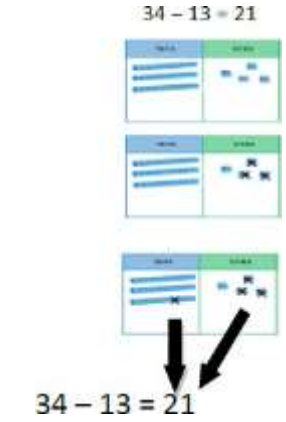
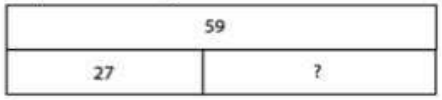
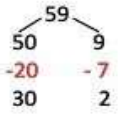
Explore the composition of numbers to 10.	Focus on composition of numbers to 5 before moving onto larger numbers. Use cubes, counters and objects of interest to subtract from a set.  5 cherry buns, 3 get eaten, how many are left?	Provide a range of visual models and stories for subtraction.  Using pictures to illustrate subtraction for example, 4 frogs on the lily pad, one jumps off. Encourage children to subitise small amounts.	  Encourage children to record in their own way and explain their jottings.
Automatically recall subtraction facts for numbers 0-10.	Make amounts using concrete resources. Use models including; part whole, 5 frames, 10 frames, Numicon, dominoes.   	Have a sustained focus on each number to 10.  Make visual, practical displays showing different ways of making numbers to 10 so that children can refer to these. 	Children solve problems relating to subtraction facts for numbers 0-10. 

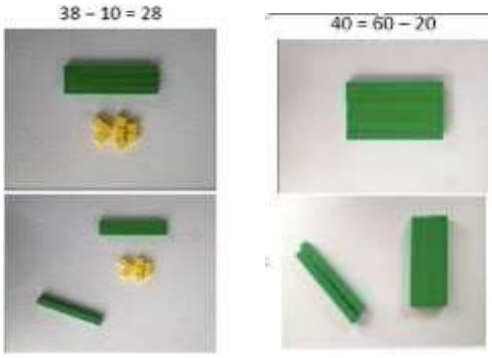
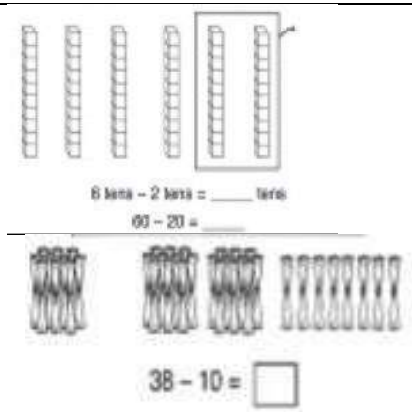
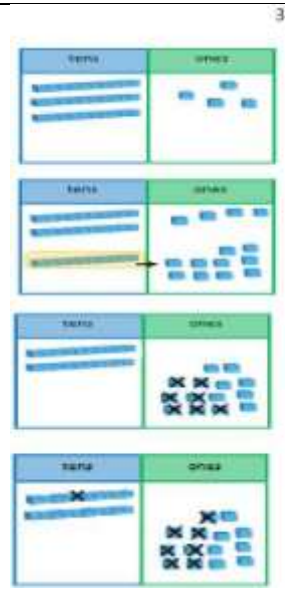
Subtraction

YEAR 1

Year 1 Taking away from the ones.	  Use physical objects, counters, cubes etc to show how objects can be taken away.  6—4 = 2  4—2 = 2	Children draw the concrete resources they are using and cross out the correct amount.   	7 − 1 = ☐ 2 − 1 = ☐ 6 − 1 = ☐ 1 − 1 = ☐ 4- 3 = ☐ =4 - 3  
Year 1 Counting back	Using number lines or tracks. Make the large number. Move the beads along the bead string as you count backwards in ones.   13 - 4 =	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.

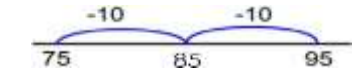
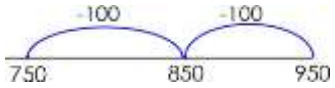
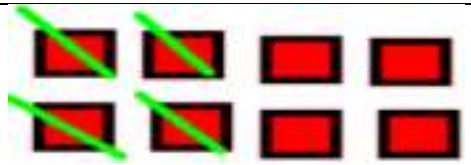
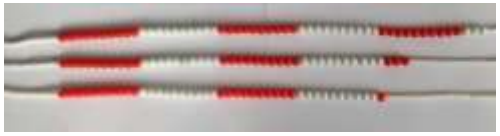
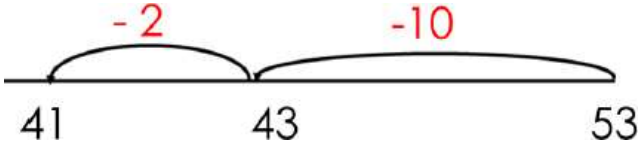
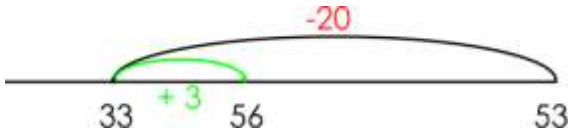
Represent and use subtraction facts within 20. Part-Part Whole model.	Link to addition – use the part whole model to help explain the inverse between addition and subtraction.  10-6 = 4	Use a pictorial representation of objects to show the part – part – whole model. Any objects can be used for this.  	Move to using numbers within the part-part-whole model. 
Make Ten Strategy	14 - 5 = Make 14 on the ten frame. Take 4 away to make ten, then take 1 more away to make 9.  	 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?
Regroup ten into ten ones.	 Use a place value chart to show how to change a ten into ten ones, use the term ‘take and make’.	 20 - 4 =	20 – 4 = 16

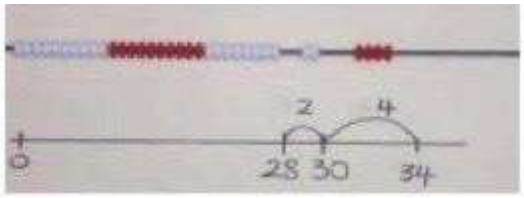
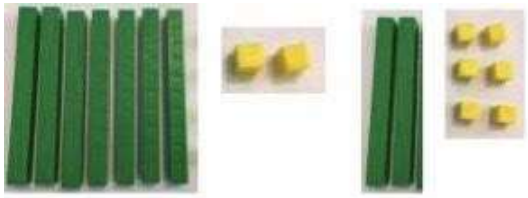
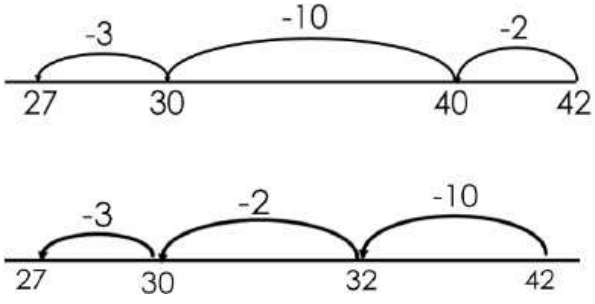
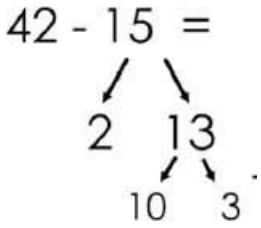
Subtracting from the tens	Subtract from the ten where the one is too small, then combine the remainder with the ones. 		
Partitioning to subtract without regrouping.	Use Dienes to show how to partition the number when subtracting without regrouping.  	 59 – 27 Using number lines and part-part whole model Part–part–whole diagram:  59- 27 = _____  Partition the number 59 Partition 27 and subtract the ones and the tens. Place the partitioned number back together. Children draw representations of Dienes and cross off.  43—21 = 22	59 - 27 = 32

Year 1 Subtracting multiples of ten	Use Dienes to model subtracting multiples of ten. 		70 - ☐ = 30 43 - ☐ = 13
Year 1 Column method with regrouping		Children draw the concrete resources they are using and cross out the correct amount.	46 - 18 = 24 - 6 =

Subtraction

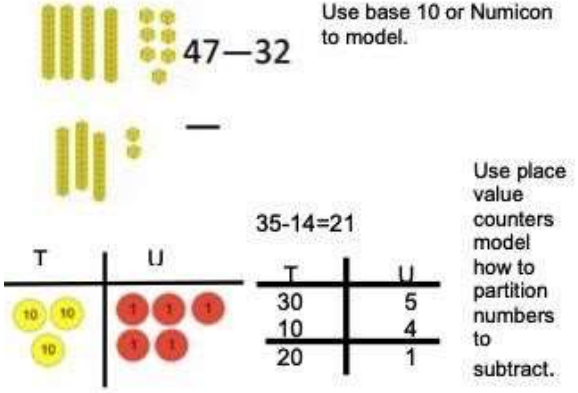
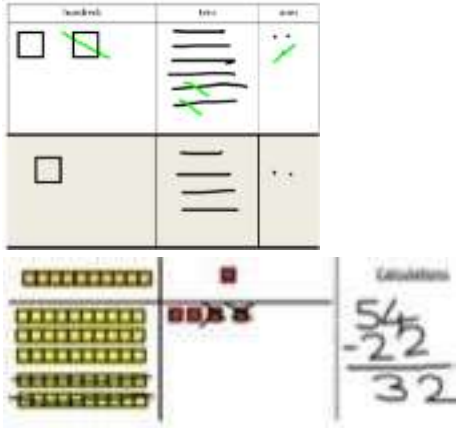
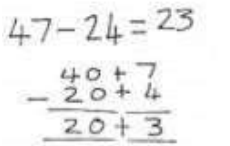
Year 2

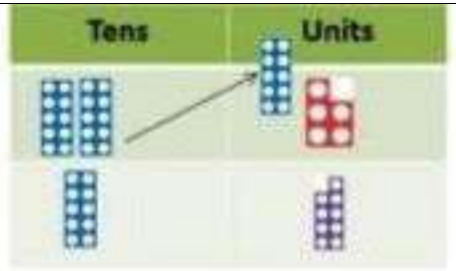
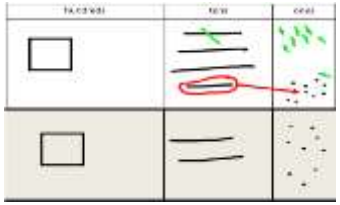
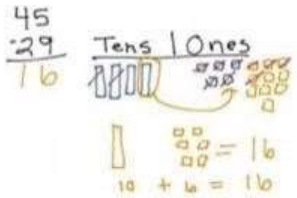
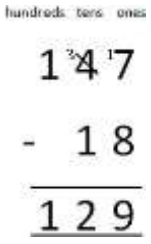
Counting back in multiples of ten and one hundred		 	Counting back in multiples of ten and one hundred. 95 - 20 = 950 - 200 =
Using known fact to explore derived facts			8 – 4 = 4 *leads to* 80 – 40 = 40 *leads to* 800 – 400 = 400
Subtracting tens and ones by partitioning first.	Use concrete resources to model subtraction by partitioning the number first. 	 Use number lines to illustrate the partition method.	53 – 12 = 41
Round and adjust (compensation strategy)	Use concrete resources to model rounding up to the nearest multiple of ten, subtracting and adjusting. 		53 – 17 = 36

Make ten strategy	Use concrete resources to model counting to the next ten and the rest.  **34 - 28** =  **72 - 26 =**	 Use number lines to count to the next ten and the rest.	

Subtraction

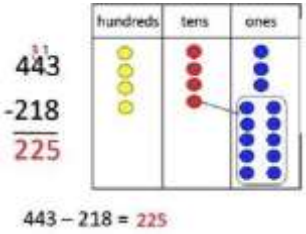
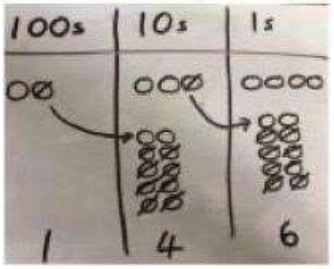
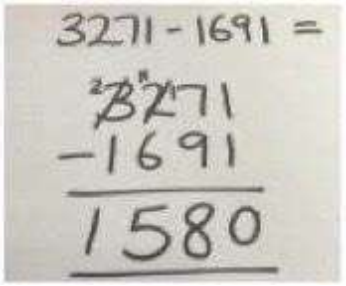
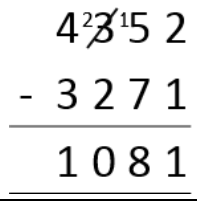
Year 3

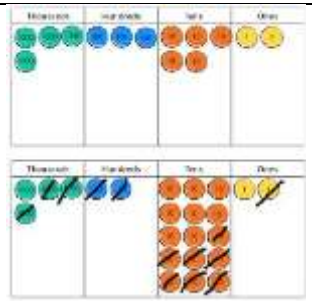
Beginning to use the column method to subtraction without grouping	 Use base 10 or Numicon to model. Use place value counters model how to partition numbers to subtract.	Represent methods pictorially.  	 Intermediate step may be needed to lead to clear subtraction understanding. 

Beginning to use the column method to subtraction with grouping	 Begin with base 10 or Numicon. Then move to place value counters, modelling the exchange of a ten into ten ones. Use the phrase 'take and make' for exchange.	 Children draw base 10 or place value counters and cross off. 	 Partition into place value columns if needed before moving onto formal methods. 

Subtraction

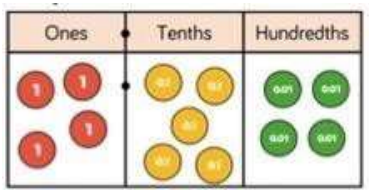
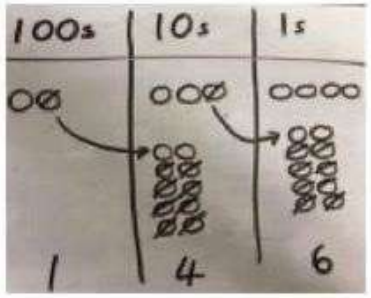
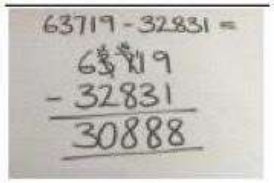
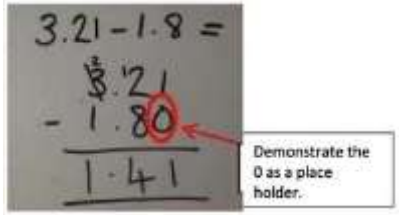
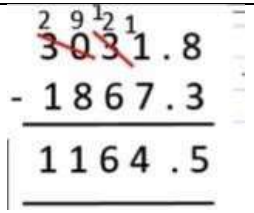
Year 4

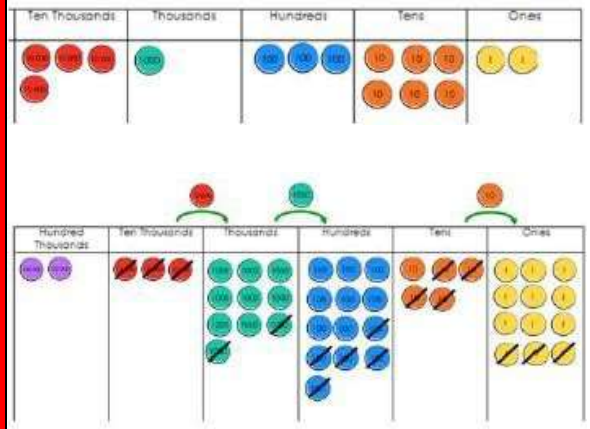
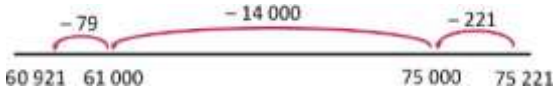
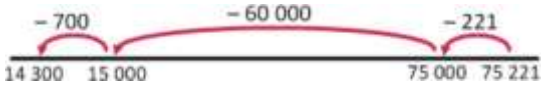
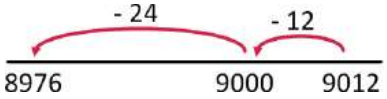
Subtracting tens and ones Subtract with up to 4 digits. *Introduce decimal subtraction through context of money.*	Model the process of exchanging using Numicon, base 10 and place value counters.  4352 - 3271 =	 Draw the counters onto a place value grid and show what you have subtracted by crossing out the counters, as well as clearly showing the exchanges you make.	 Use the phrase 'take and make' for the exchange. 

Subtraction

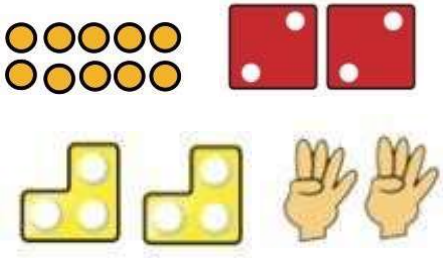
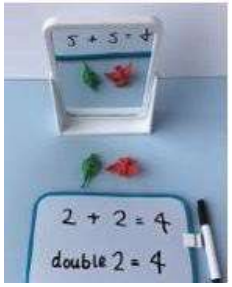
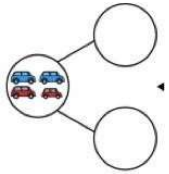
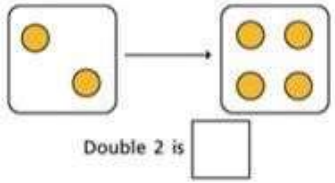
Year 5 & 6

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 on from year 4 using Numicon, base 10 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.  	 
Subtract with increasingly large and more complex numbers and decimal values	Continue to use place value counters, Numicon, base ten where appropriate. You can use the terms 'exchange' with subtraction but it needs careful consideration. You can regroup 62 as 50 and 12 (5 tens and 12 ones) instead of 60 and 2 (6 tens and 12 ones). Or you can 'exchange' one of the tens for 10 ones resulting in 5 tens and 12 ones.	Represent pictorially with a number line, starting on the right and having the arrows jump to the left:  Develop understanding that the parts can be subtracted in any order and the result will be the same:	

	If you have exchanged, then the number has been regrouped.  	 Extend the 'Make ten' strategy (see guidance in Y1 or Y2) to count back to a multiple of 10.  	
Calculate difference by 'counting back' And 'counting on'		Place the numbers either end of a number line and work out the difference between them. Select efficient jumps.  Finding the difference is efficient when the numbers are close to each other:  	75 221 – 14 300 = 9012 – 8976 =

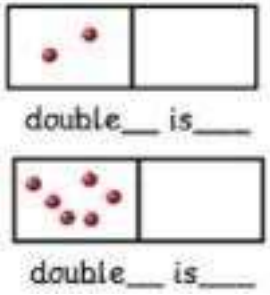
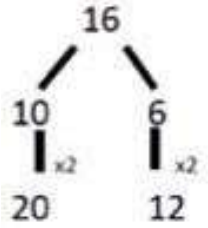
Multiplication

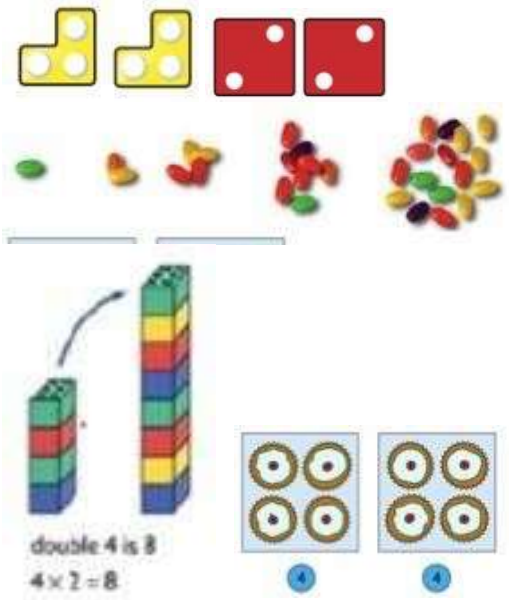
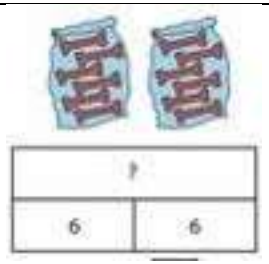
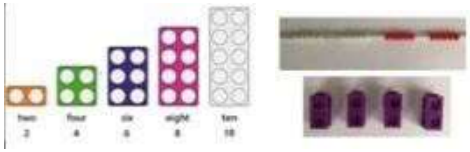
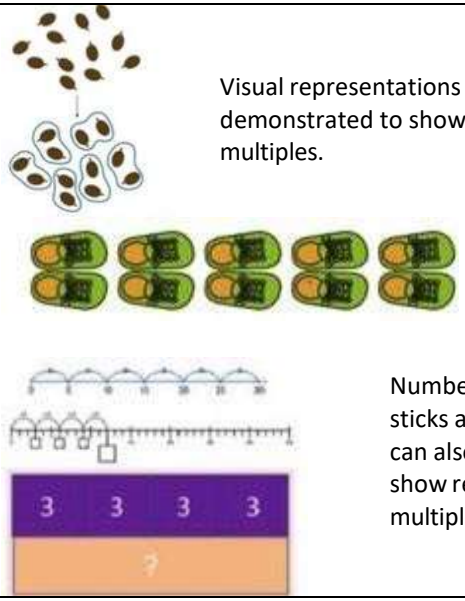
Year R

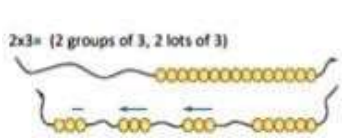
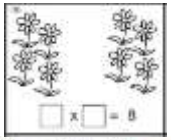
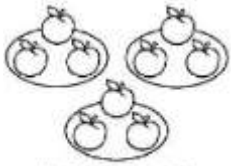
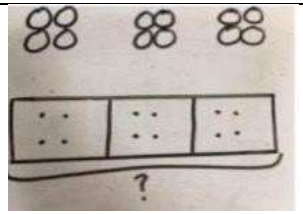
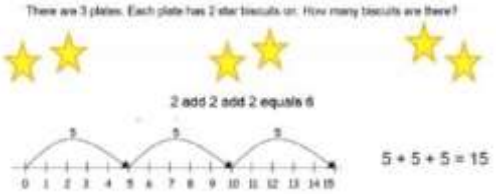
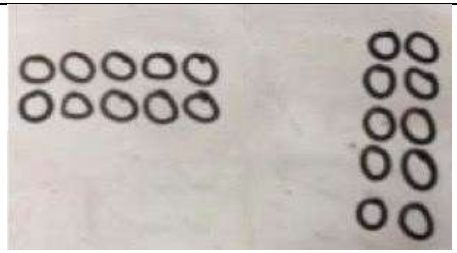
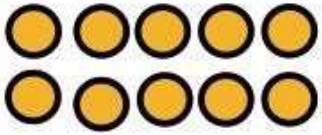
Doubling using numbers to 5.	Using a range of practical activities and equipment to demonstrate doubling. 	Draw pictures to demonstrate the doubling of numbers.   Encourage children to make their own jottings to explain their understanding.	Use part, part whole to partition and recombine doubles.  

Multiplication

Year 1

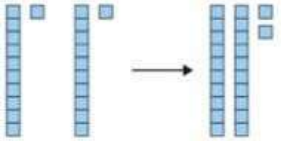
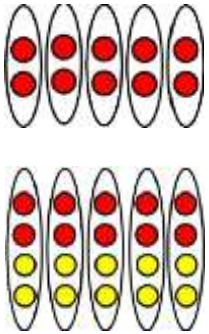
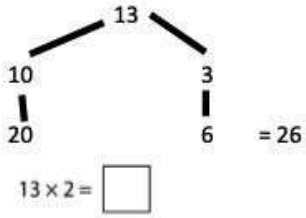
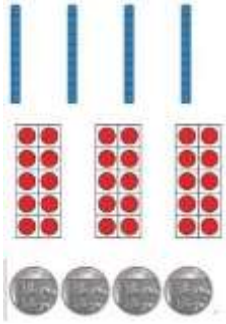
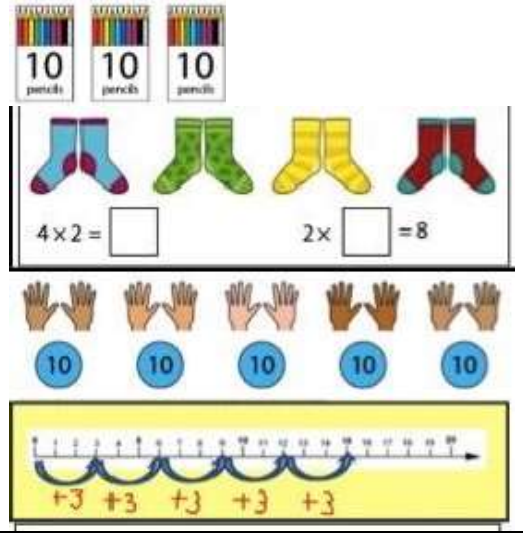
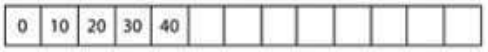
Doubling	Using a range of practical activities and equipment to demonstrate doubling.	Draw pictures to demonstrate the doubling of numbers.  Bar models are useful for demonstrating doubles.	Partition a number and then double each part before recombining it back together.  Double 16 = 16 + 16 = □ + 16 = 32

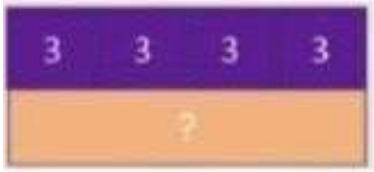
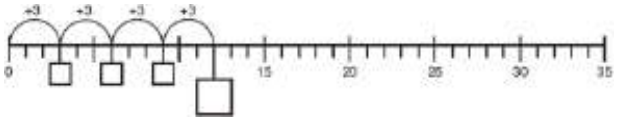
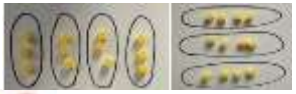
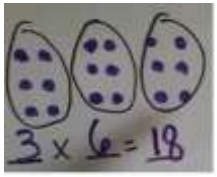
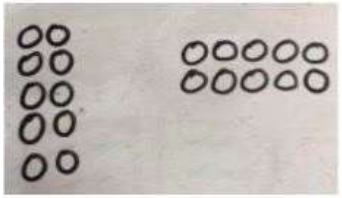
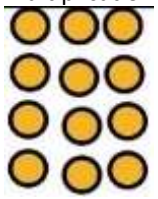
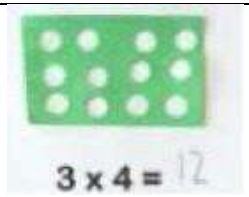
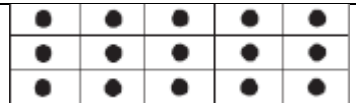
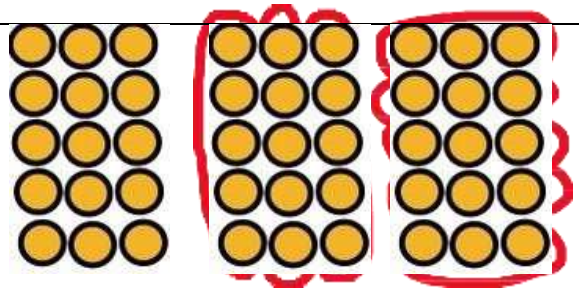
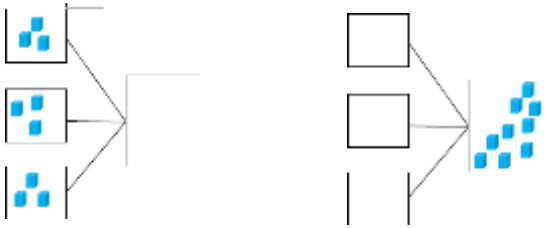
			
Skip counting in multiples of 2, 5, 10 from zero	Count the groups as children are skip counting.  	 Visual representations of objects can be demonstrated to show counting in multiples. Number lines, counting sticks and bar models can also be used to show representations of multiples.	Count in multiples of a number aloud. Write sequences of numbers. 2, 4, 6, 8, 10 5, 10, 15, 20, 25, 30 2 x 3 = ☐

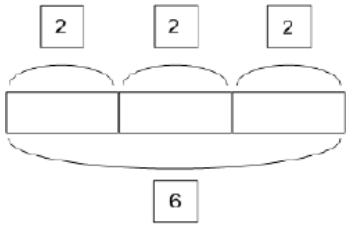
Making equal groups and counting the total	Children need lots of practice in creating equal groups with practical resources.  	 Children split objects into different groups. How many groups of 10 are there? What is the total amount? 6 x 10 =  Complete the sentences  There are ___ groups of ___ pencils.	2 x 6 = 12
Solve multiplications using repeated addition	Use different objects to add equal groups.   	   Use pictorial representations including number lines and bar models.	Write addition sentences to describe objects and pictures.  2 + 2 + 2 + 2 = 8
Understanding arrays	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

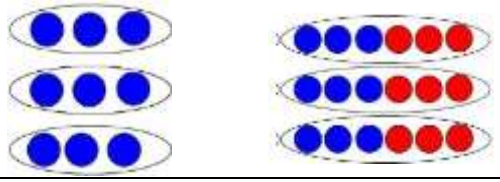
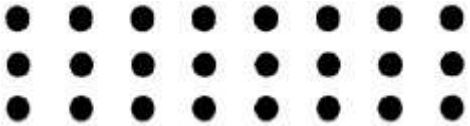
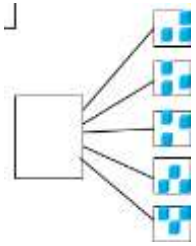
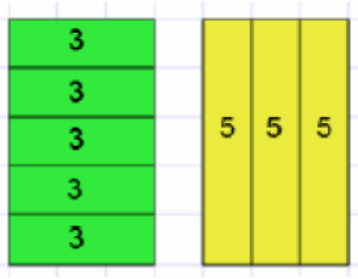
Year 2

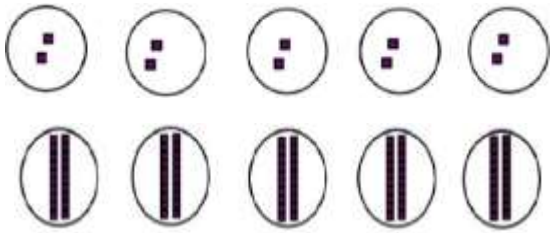
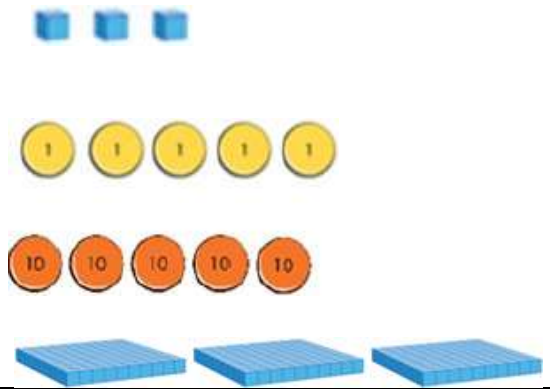
Doubling	Model doubling using Dienes and place value counters.  double 11 = double 10 + double 1 = 20 + 2 = 22	Draw pictures and representations to show how to double numbers. 	Partition a number and then double each part before recombining it back together. *'There are thirteen pairs of socks. How many socks are there altogether?'*  13 10 3 20 6 = 26 13 x 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.  10 10 10 4 x 2 = ☐ 2x ☐ = 8 10 10 10 10 10 +3 +3 +3 +3 +3	Counting in multiples of a number aloud. *'Fill in the missing numbers.'*  0 10 20 30 40 ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ Write in sequences with multiples of numbers. 5 + 5 + 5 + 5 + 5 + 5 + 5 + 5 = ☐ 3 x 4 = ☐

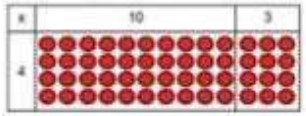
Skip Counting in multiples of 2, 3, 5, and 10 from zero.	 		
Multiplication is commutative	Pupils should understand that an array can represent different equations and that, as multiplication is commutative, the order of multiplication does not affect the answer.  	Children to represent the arrays pictorially. 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
Arrays represent multiplication equations.	 	 	3 x 5 =
Using the inverse This should be taught alongside division, so pupils learn how they work	 Children to use equipment	Use the part, part, whole model to show inverse relationship between multiplication and division. 	3 × 3 = ☐ 9 ÷ 3 = ☐

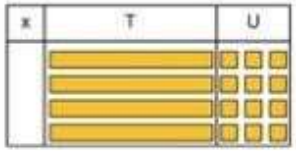
alongside each other.	to build arrays children split the array into equal groups. **15 ÷ 3 = 5** **15 ÷ 5 = 3**		

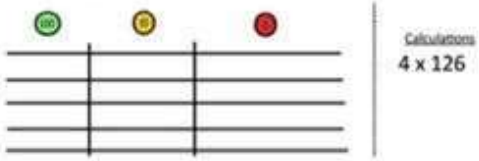
Multiplication **Year 3**

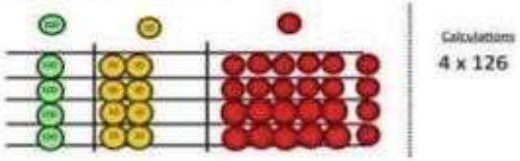
Doubling to derive new multiplication facts			3 x 3 = 9 3 x 6 = double 9 = 18
Skip counting 2,3,4,5,6,8,10 from 0.			3 x1 = 3 x 2 = 3 x 3 = 3 x 4 = 3 x 5 = 3 x 6 = 3 x 7 = 3 x 8 =
Use part-part whole model and bar model to establish the commutative relationship between multiplication and division.			5 x 3 = 15 3 x 5 = 15 15 ÷ 3 = 5 15 ÷ 5 = 3

Ten Times greater	Pupil's work on this must be firmly based on concrete representations – the language of ten times greater must be well modelled and understood to prevent the numerical misconception of 'adding a zero'.		2 x 10 = 20 10 x 10 = 100
Multiplying by ten and one hundred			3 x 1 = 3 5 x 1 = 5 5 x 10 = 50 3 x 100 = 300

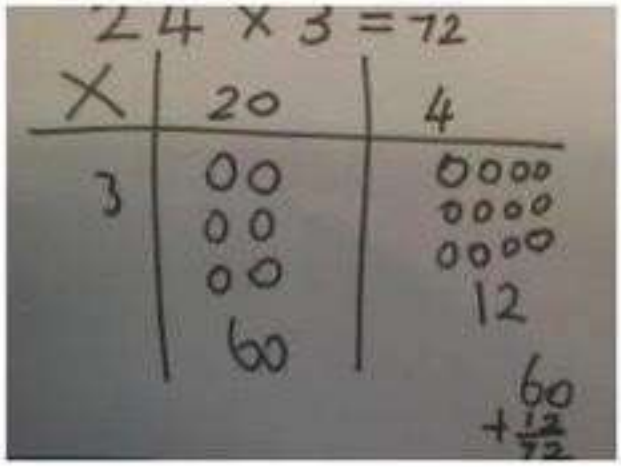
<table>
<tr>
<td>Multiplication of 2-digit numbers with partitioning (no regrouping)</td>
<td>
Show the link with arrays to first introduce the grid method.
4 rows of 10
4 rows of 3


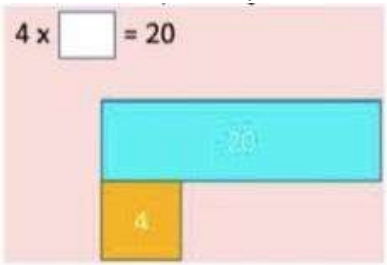
Move on to using Base 10 to move towards a more compacy method.


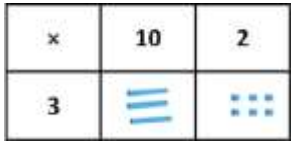
Move on to place value counters to show how we are finding groups of a number. We are multiplying by 4 so we need 4 rows.


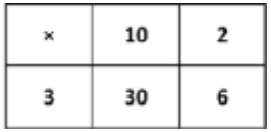
Fill each row with 126


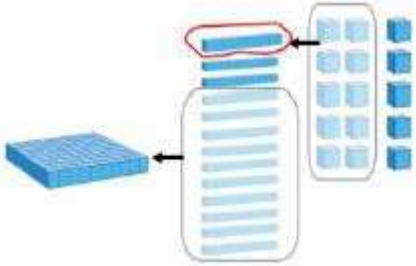
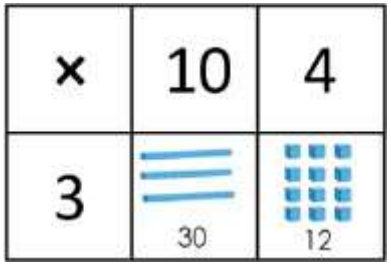
Add up each column starting with the ones making any exchanges needed.
Then you have your answer.

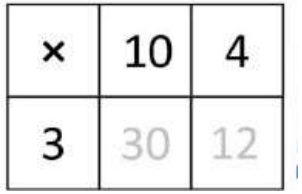
</td>
<td>
Children can represent the work they have done with place value counters in a way that they understand. They can draw the counters, using colours to show different amounts or just use circles in the different columns to show their thinking.


Use bar models to explore missing numbers.


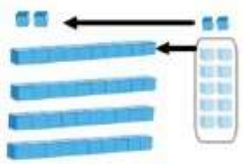
</td>
<td>




</td>
</tr>
<tr>
<td>Multiplication of 2-digit numbers with partitioning (regrouping)</td>
<td>

</td>
<td>


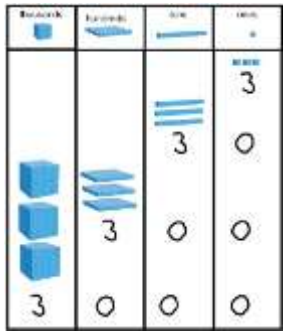
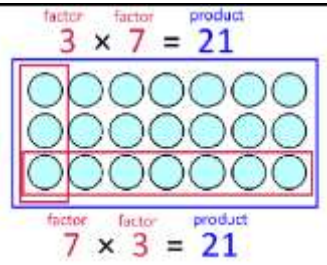
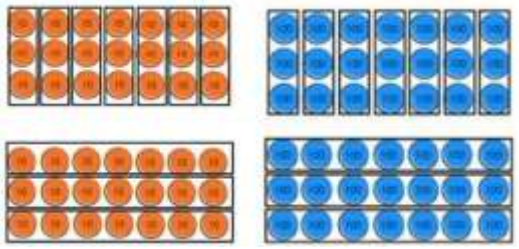
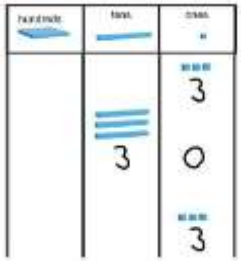
</td>
<td>


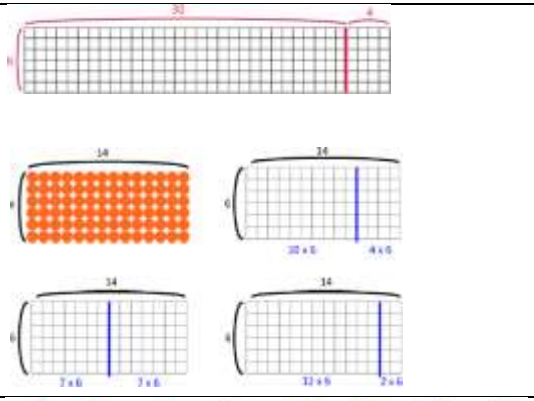
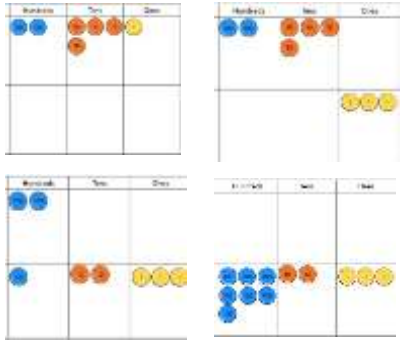
</td>
</tr>
</table>

Multiplication

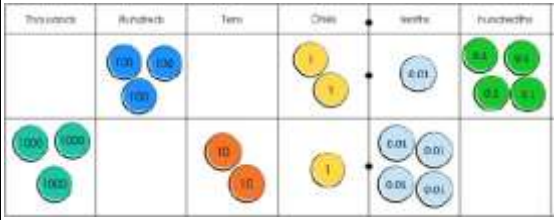
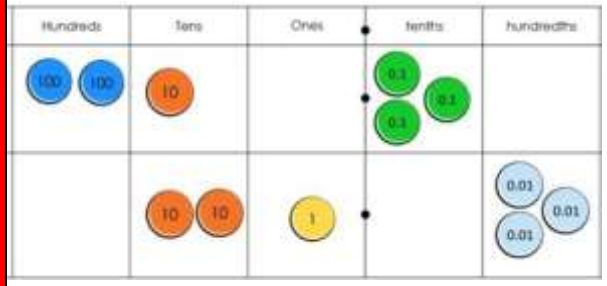
Year 4

Multiplying by 10 and 100			3 x 10 = 30 3 x 100 = 300 3 x 1000 = 3000
Using known facts and place value for mental multiplication involving multiples of 10 and 100			30 x 7 = 210 70 x 3 = 210 7 x 30 = 210 3 x 70 = 210 300 x 7 = 2100 700 x 3 = 2100 7 x 300 = 2100 3 x 700 = 2100
Dividing multiples of 10, 100 and 1000 by 10, 100 and 1000 using scaling down			**3 × 10 = 30** **30 ÷ 10 = 3**

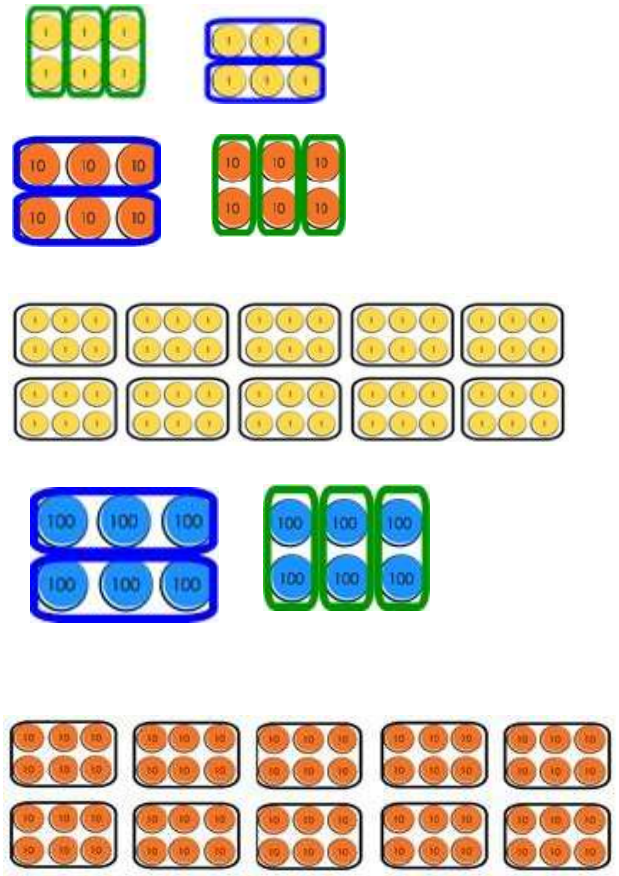
Multiplying by partitioning one number and multiplying each part			30 × 6 + 4 × 6 14 x 6
Mental multiplication of three 1-digit numbers, using the associative law			(4 x 2) x 7 or 4 x (2 x 7) **Distributive law** Four pots each containing two flowers which each have seven petals. How many petals in total?
Short multiplication of 3-digit number by 1-digit number			241 x 3 723 1

Multiplication

Year 5 & 6

Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000	When you multiply by ten, each part is ten times greater. The ones become tens, the tens become hundreds, etc. When multiplying whole numbers, a zero holds a place so that each digit has a value that is ten times greater.  When you divide by ten, each part is ten times smaller. The hundreds become tens and the tens become ones. Each digit is in a place that gives it a value that is ten times smaller. When dividing multiples of ten, a place holder is no longer needed so that each digit has a value that is ten times smaller. E.g. 210 ÷ 10 = 21  		102.14 x 10 = 1021.4 210.3 ÷ 10 = 21.03

Using known facts and place value to derive multiplication fact



2 x 3 = 6
3 x 2 = 6

2 x 30 = 60 3 x 20 = 60
30 x 2 = 60 20 x 3 = 60

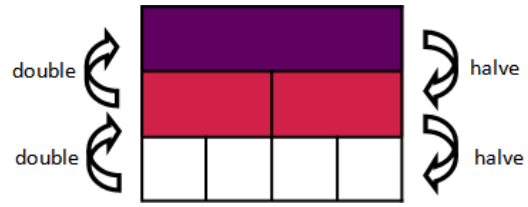
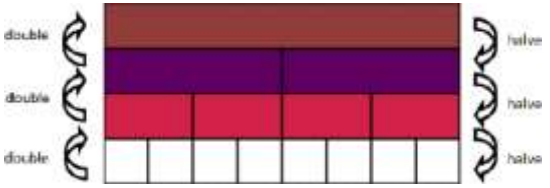
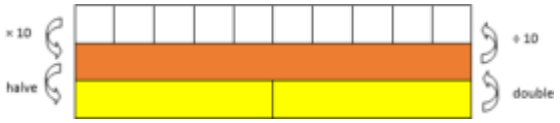
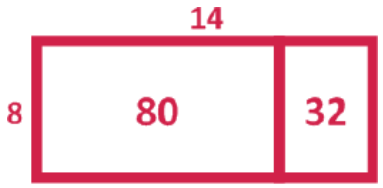
2 x 3 x 10= 60

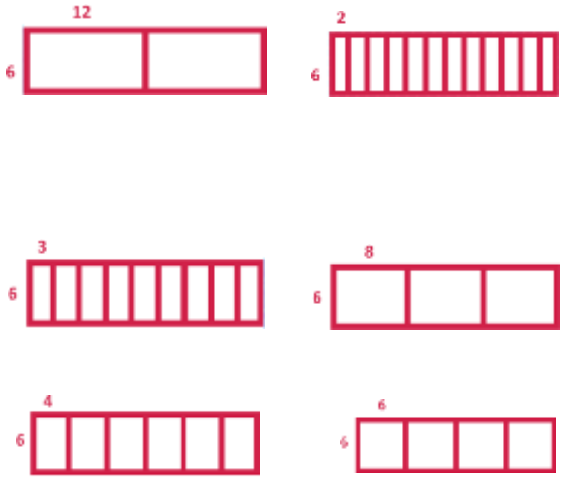
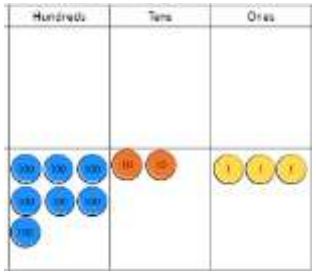
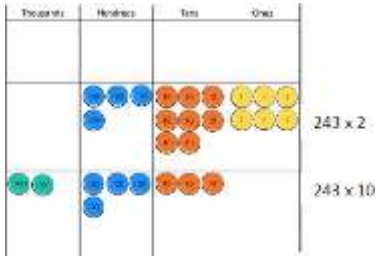
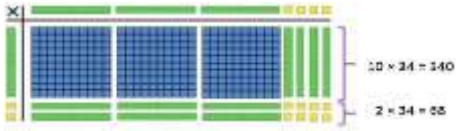
2 x 300 = 600
300 x 2 = 600
3 x 200 = 600
200 x 3 = 600

2 x 30 x 10 = 600
20 x 3 x 10 = 600
20 x 30 = 600
30 x 20 = 600

These are the multiplication facts pupils should be able to derive from a known fact.

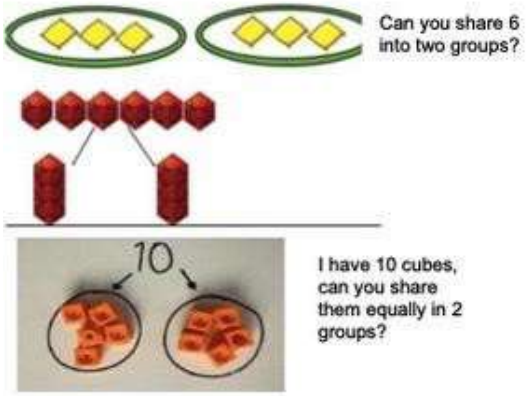
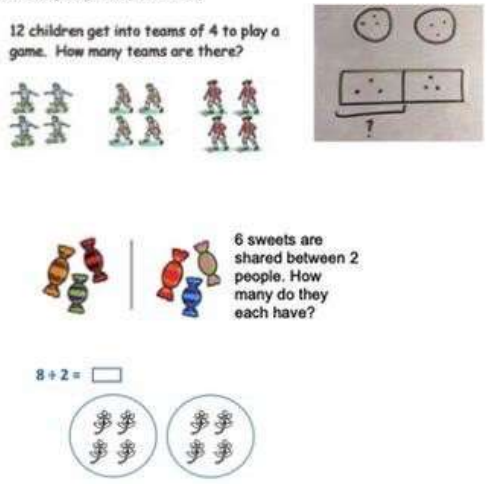
2 100 000		700 000 x 3	70 000 x 30	7000 x 300	700 x 3000	70 x 30 000	7 x 300 000
210 000		70 000 x 3	7000 x 30	700 x 300	70 x 3000	7 x 30 000	
21 000		7000 x 3	700 x 30	70 x 300	7 x 3000		
2100		700 x 3	70 x 30	7 x 300			
210		70 x 3	7 x 30				
21	=	**7 x 3**					
2.1		0.7 x 3	7 x 0.3				
0.21		0.07 x 3	0.7 x 0.3	7 x 0.03			
0.021		0.007 x 3	0.07 x 0.3	0.7 x 0.03	7 x 0.003		

Doubling and halving		  	Multiply by 4 by doubling and doubling again e.g. 16 × 4 = 32 × 2 = 64 Divide by 4 by halving and halving again e.g. 104 ÷ 4 = 52 ÷ 2 = 26 Multiply by 8 by doubling three times e.g. 12 × 8 = 24 × 4 = 48 × 2 = 96 Divide by 8 by halving three times e.g. 104 ÷ 8 = 52 ÷ 4 = 26 ÷ 2 = 13 Multiply by 5 by multiplying by 10 then halving, e.g. 18 × 5 = 180 ÷ 2 = 90. Divide by 5 by dividing by 10 and doubling, e.g. 460 ÷ 5 = double 46 = 92
Multiply by partitioning one number and multiplying each part Distributive law a x (b + c) = a x b + a x c	 Cuisenaire rods to build arrays Bead string where each bead has a value of 8: 	 Represent with area model  Jottings on a number line	8 x 14 = 8 x 10 + 8 x 4

Using knowledge of factors			Calculate 6 x 24 by using factor pairs of 24 Two and twelve are factors of 24: 6 x 2 x 12 6 x 12 x 2 Three and eight are factors of 24: 6 x 3 x 8 6 x 8 x 3 Four and six are factors of 24: 6 x 4 x 6 6 x 6 x 4
Formal written method of short multiplication			241 x 3 723 1
Multiplying by a 2-digit number Formal written method of long multiplication	243 x 12  12 x 34: 		243 x 12 486 2430 34 x 12 68 340 408

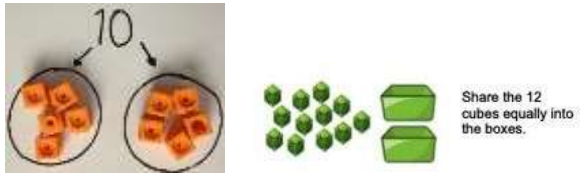
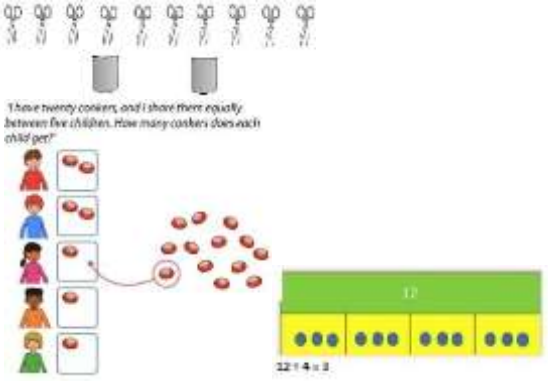
Division

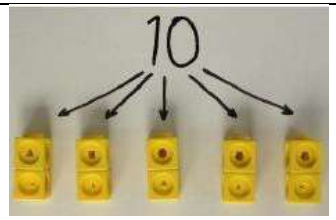
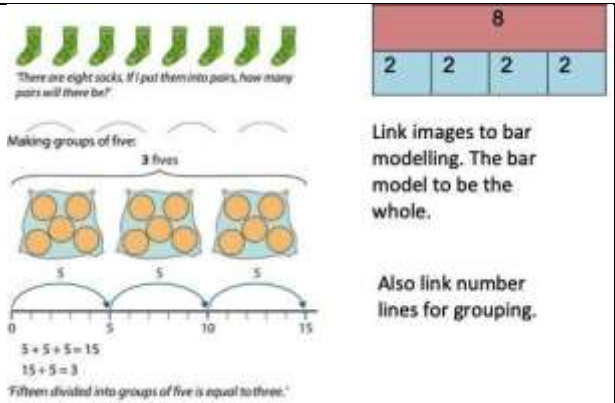
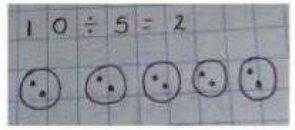
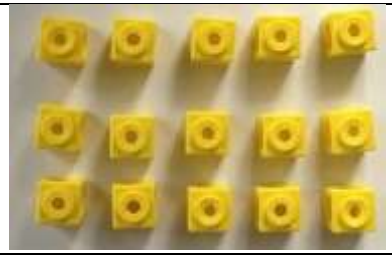
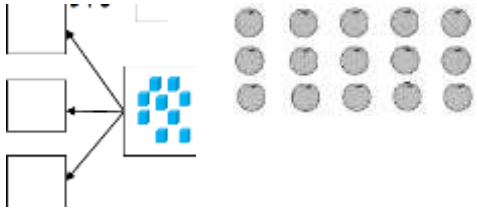
Year 1

Division as sharing	Use a range of equipment to introduce sharing. 	Sharing objects pictorially 	Share 9 buns between three people. 9 ÷ 3 = 3

Division

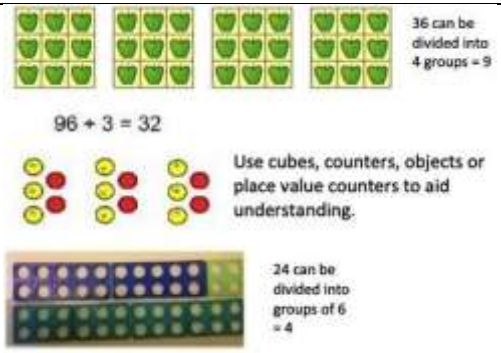
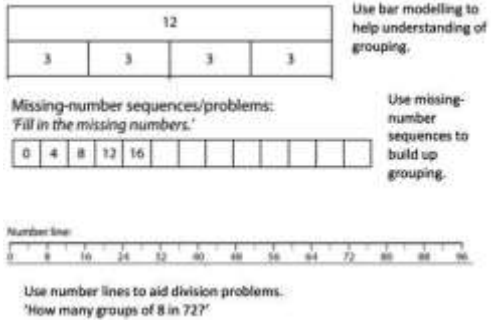
Year 2

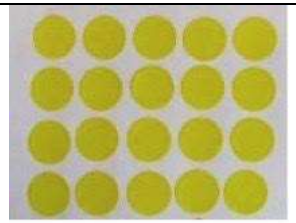
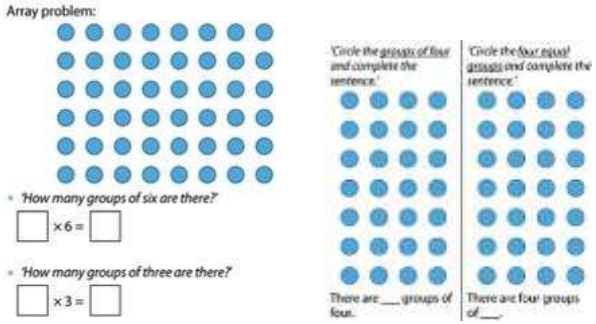
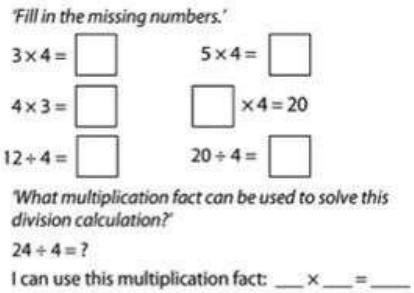
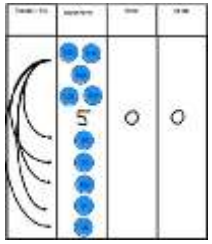
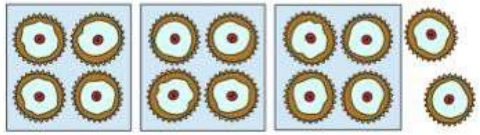
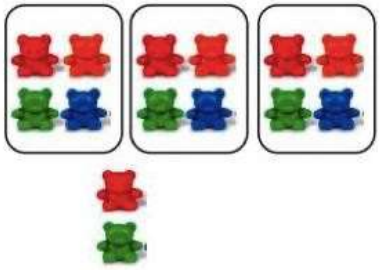
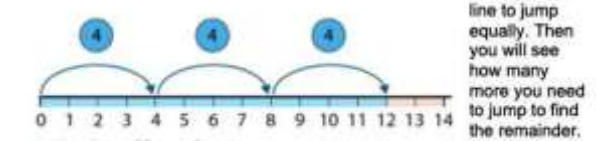
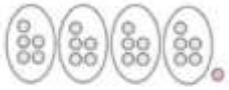
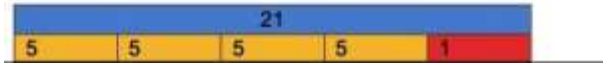
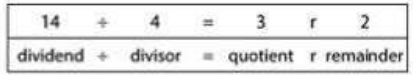
Division as sharing	Use a range of equipment to develop sharing. 	Children use pictures or shapes to share quantities.  Use bar models to support understanding.	10 ÷ 2 = 5

Division as grouping	 Divide quantities into equal groups. Use cubes, counters, objects and place value counters to help understanding. 	 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 10 sweets altogether and decides to put 2 in every bag. How many bags can he fill? 
Arrays and part, part, whole models to emphasise the relationship between multiplication and division.			15 ÷ 5 = 3 15 ÷ 3 = 5

Division

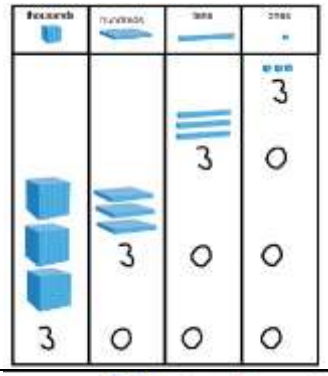
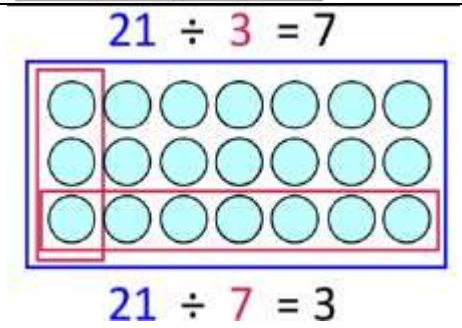
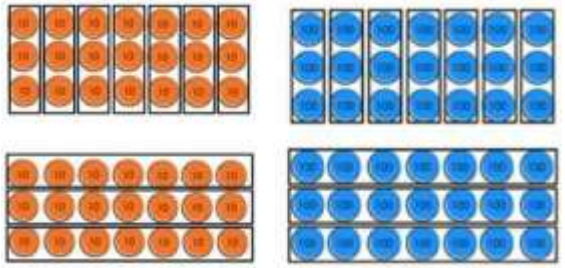
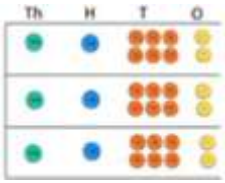
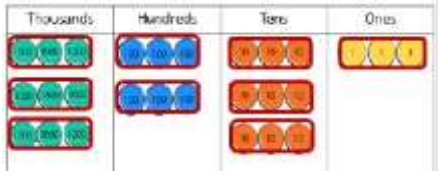
Year 3

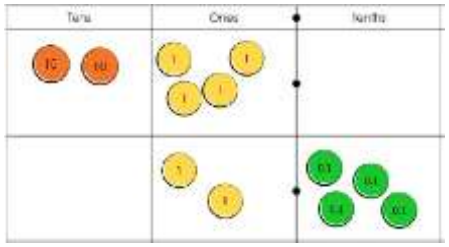
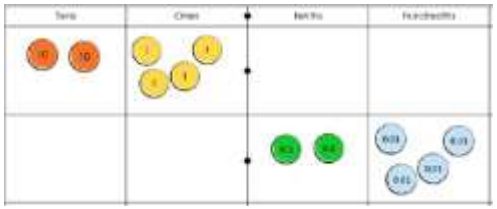
Division as grouping			How many groups of 8 in 32? 32 ÷ 8 = 4

	 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	Draw an area and use lines to split them up into groups. Make division and multiplication sentences from them.  	Find the inverse of multiplication and division sentences. 
Dividing multiples of 10, 100 and 1000 by 10, 100 and 1000 using grouping			500 ÷ 100 = ☐ My whole is 500 and the value of the equal parts is 100. How many parts are there?
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?'   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.  22 ÷ 4 = ☐ r ☐ 23 ÷ 4 = ☐ r ☐

Division

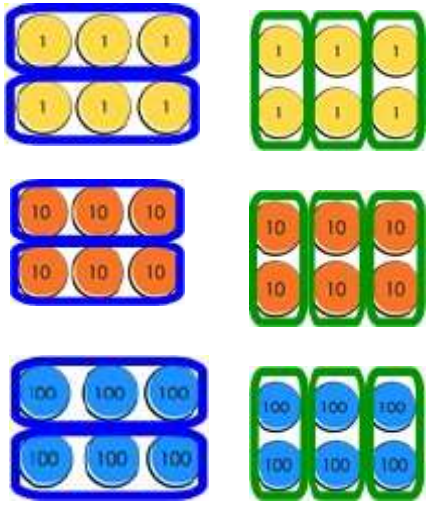
Year 4

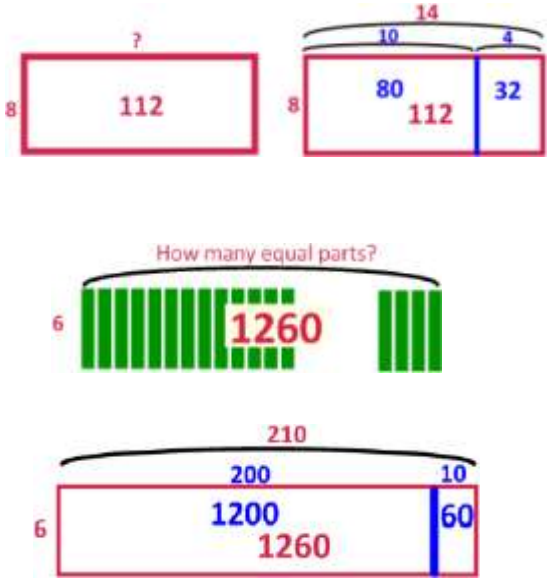
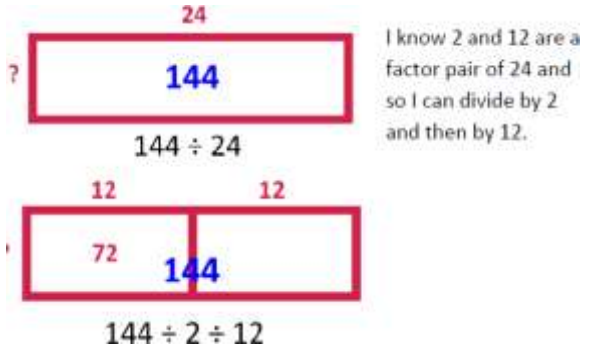
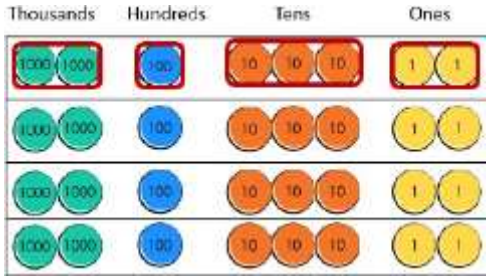
Dividing by 10 and 100			30 ÷ 10 = 3 300 ÷ 100 = 3 3000 ÷ 1000 = 3 300 ÷ 10 = 30 3000 ÷ 100 = 30 3000 ÷ 10 = 300
Derived facts			210 ÷ 7 = 30 210 ÷ 3 = 70 210 ÷ 30 = 7 210 ÷ 70 = 3 2100 ÷ 7 = 300 2100 ÷ 3 = 700 2100 ÷ 300 = 7 2100 ÷ 700 = 3
Short division of 4-digit numbers by 1-digit numbers	Division as sharing  Division as grouping 		3 3 4 8 6 Division as sharing Division as grouping 3 2 3 1 3 9 6 9 3

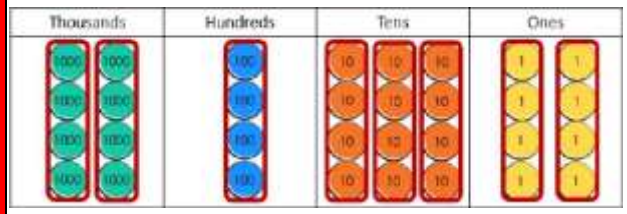
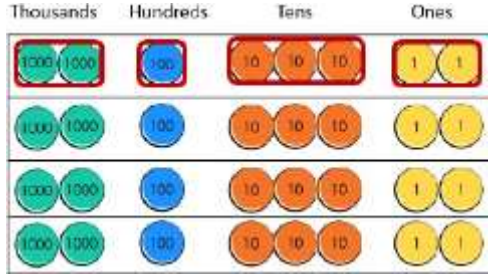
Division of a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths	 		24 ÷ 10 = 2.4 24 ÷ 100 = 0.24

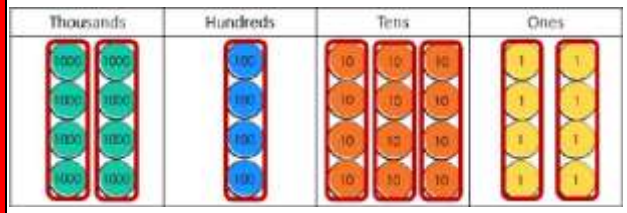
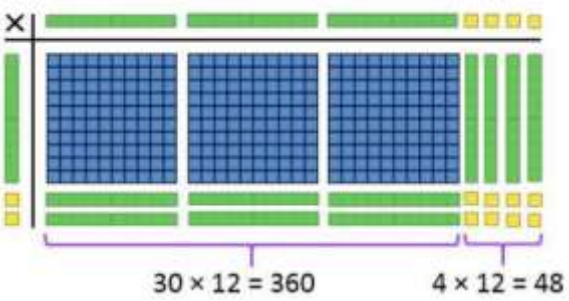
Division

Year 5 & 6

Deriving facts from known facts			6 ÷ 2 = 3 6 ÷ 3 = 2 60 ÷ 2 = 30 60 ÷ 30 = 2 60 ÷ 3 = 20 60 ÷ 20 = 3 600 ÷ 2 = 300 600 ÷ 300 = 2 600 ÷ 3 = 200 600 ÷ 200 = 3

Using knowledge of multiples to divide			112 ÷ 8 = 80 ÷ 8 + 32 ÷ 8 1260 ÷ 6 = 1200 ÷ 6 + 60 ÷ 6
Using knowledge of factors to divide		 I know 2 and 12 are a factor pair of 24 and so I can divide by 2 and then by 12.	
Short division Dividing a 4-digit numbers by 1-digit numbers	Sharing 		8528 ÷ 4 2 1 3 2 4 | 8 5 12 8

	8 thousand shared into 4 equal groups 5 hundred shared into 4 equal groups Regroup 1 hundred for 10 tens 12 tens shared into 4 equal groups 8 ones shared into 4 equal groups. Grouping  How many groups of 4 thousand in 8 thousand? How many groups of 4 hundred in 5 hundred? Regroup 1 hundred for 10 tens. How many groups of 4 tens in 12 tens? How many groups of 4 ones in 8 ones?		
Short division Dividing a 4-digit numbers by 1-digit numbers	Sharing  8 thousand shared into 4 equal groups 5 hundred shared into 4 equal groups Regroup 1 hundred for 10 tens 12 tens shared into 4 equal groups 8 ones shared into 4 equal groups.		$8528 \div 4$ $\begin{array}{r} 2132 \\ 4\overline{)8\,5^{1}2\,8} \end{array}$

	Grouping  How many groups of 4 thousand in 8 thousand? How many groups of 4 hundred in 5 hundred? Regroup 1 hundred for 10 tens. How many groups of 4 tens in 12 tens? How many groups of 4 ones in 8 ones?		
Long division Dividing a 4-digit number by a 2-digit number	408 ÷ 12  		34 12 | 408 36 48 48 0

Long division (remainder)

Start with a remainder in the ones.

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

```
  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

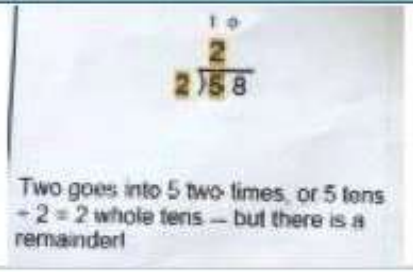
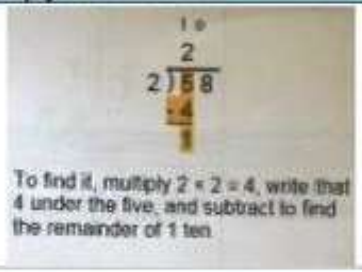
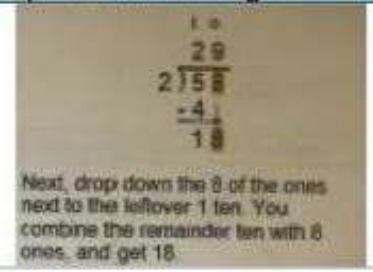
```
    th h t o
    0 4 0 2
4 ) 1 6 0 9
    -8
    1
```

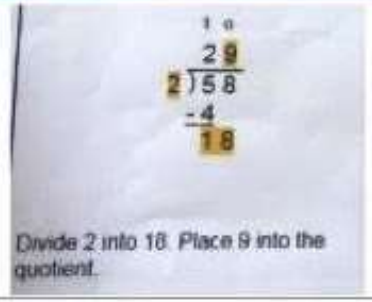
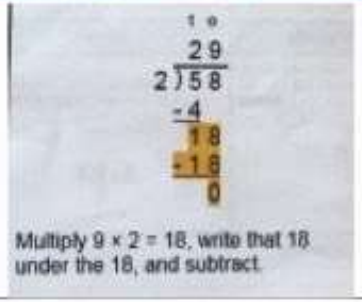
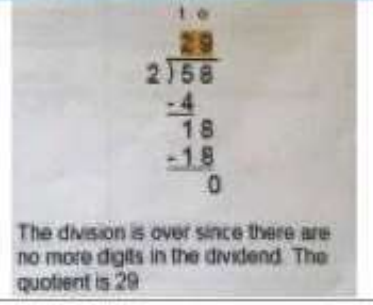
When dividing the ones, 4 goes into 9 two times. Multiply 2 × 4 = 8, write that eight under the 9, and subract. This finds us the remainder of 1.

Check: 4 × 402 + 1 = 1,609

Long division (remainder)

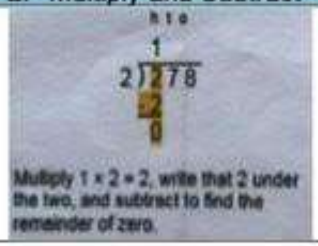
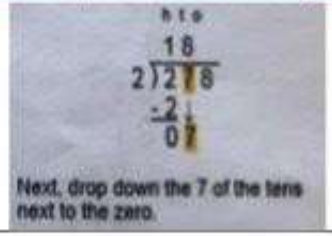
A remainder in the tens.

1. Divide	2. Multiply and Subtract	3. Drop down the next digit.
		
Two goes into 5 two times, or 5 tens ÷ 2 = 2 whole tens — but there is a remainder!	To find it, multiply 2 × 2 = 4, write that 4 under the five, and subtract to find the remainder of 1 ten.	Next, drop down the 8 of the ones next to the leftover 1 ten. You combine the remainder ten with 8 ones, and get 18.

1. Divide	2. Multiply and Subtract	3. Drop down the next digit.
		
Divide 2 into 18. Place 9 into the quotient.	Multiply 9 × 2 = 18, write that 18 under the 18, and subtract.	The division is over since there are no more digits in the dividend. The quotient is 29.

Long division (remainder).

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.