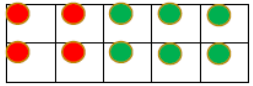
Gilthill Primary School Calculation Policy

Addition

EYFS

Guidance/models and images	Key vocabulary
Numicon shapes are introduced and used to • Identify 1 more/less • Combine pieces to add • Find number bonds • Add without counting  Children can record this by printing or drawing around numicon pieces.  Tens frames can be used to • Identify 1 more/less • Find number bonds Children can begin to combine groups of objects using concrete resources  	Plus Estimate Add More And Sum Total Make Altogether Score Double One more, two more, three more How many more make……? How many more is…… than…….? Same as

Construct number sentences verbally or with cards to go with practical

1	+	1	=	2

activities.

Children should be encouraged to read number sentences aloud in different ways.
3 + 2 = 5
Three add two equals five, five is equal to three add two or five is the same as three and two

Children make a record in pictures, words or symbols of addition activities.

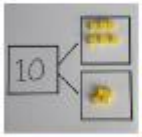
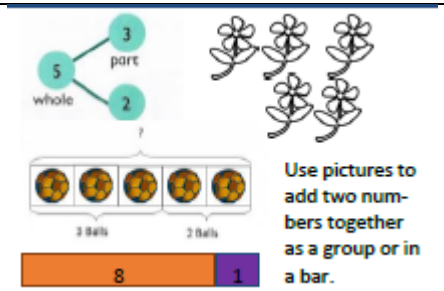
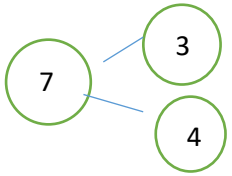
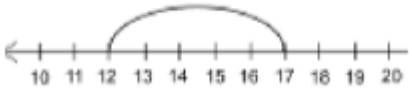
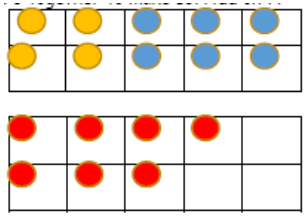
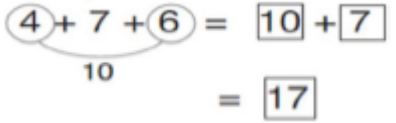
Solve simple problems using fingers

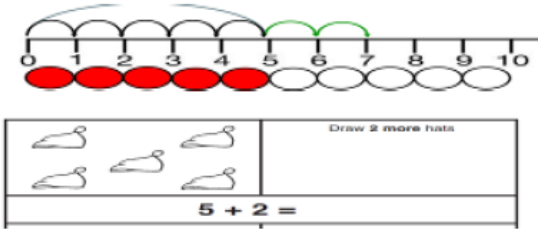
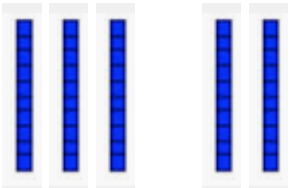
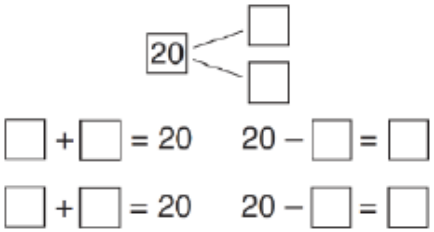
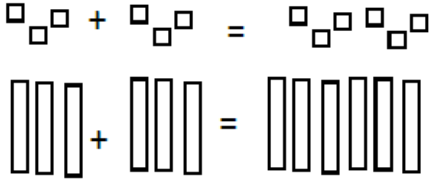
Introduce number tracks to count up on and to find one more

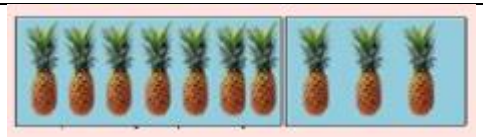
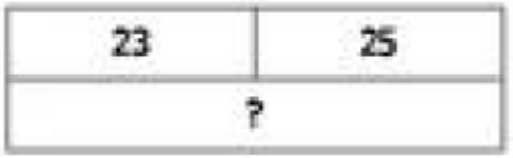
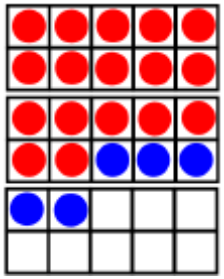
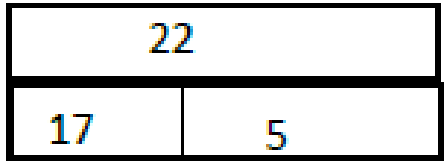
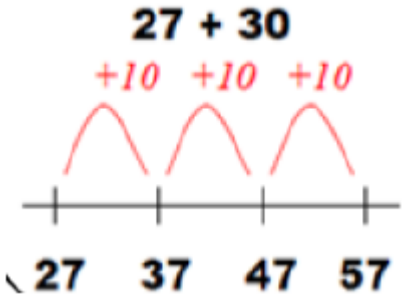
What is one more than 4?

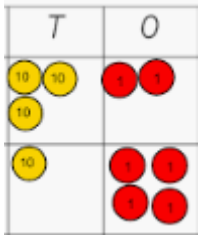
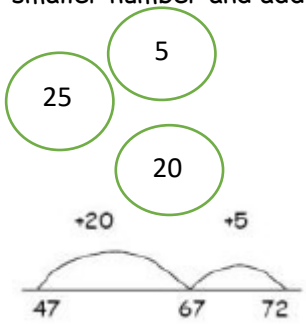
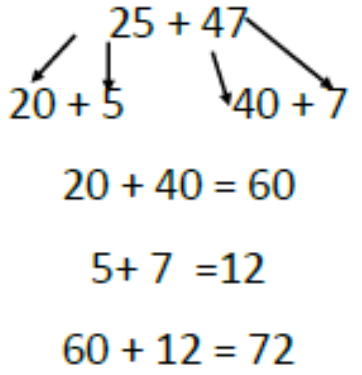
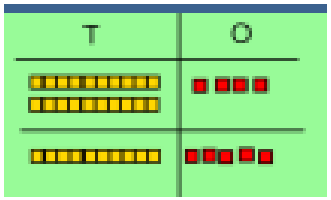
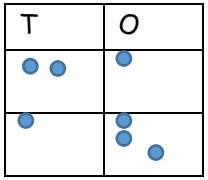
1	2	3	4	5	6

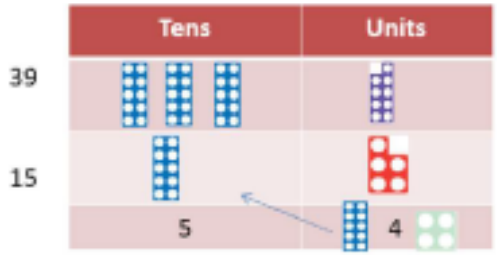
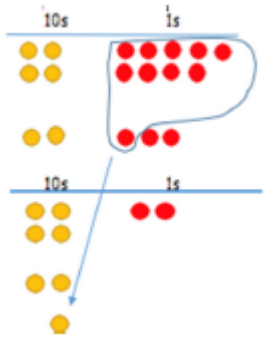
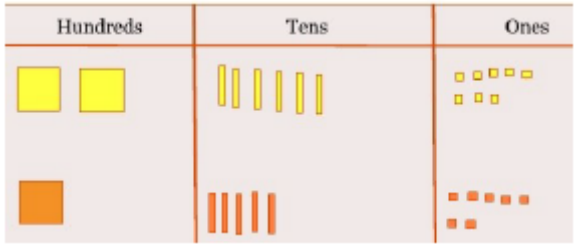
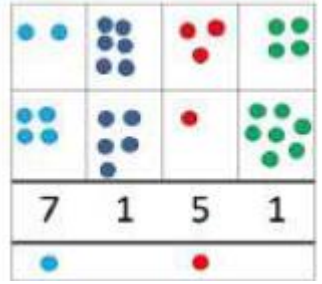
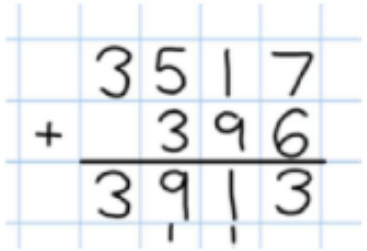
Use number lines alongside number tracks and practical apparatus to solve addition calculations and word problems.

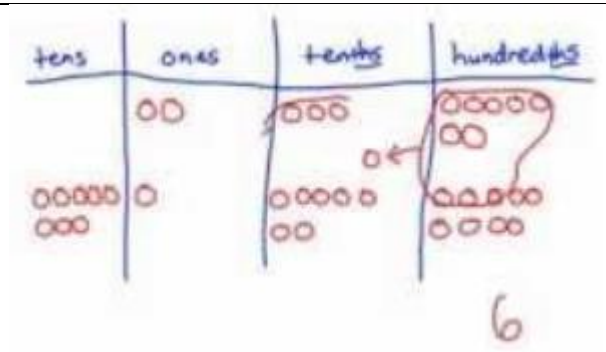
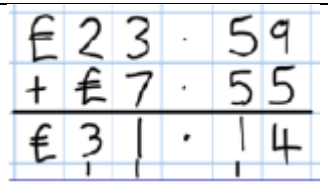
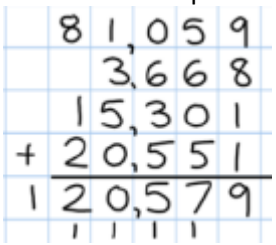
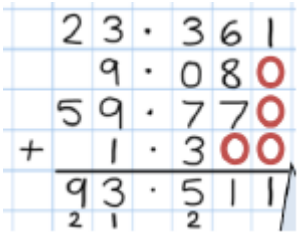
Addition			
KS1/KS2			
Objective	Concrete	Pictorial	Abstract
Combining 2 parts to make a whole, part-whole model	  Use part part whole model. Use cubes to add two numbers together as a group or in a bar. 	 Use pictures to add two numbers together as a group or in a bar.	4 + 3 = 7  4 is a part, 3 is a part and 7 is the whole
Start at the bigger number and count on	 Start with the bigger number on the bead string and then count on the smaller number 1 by 1 to find the answer	12 + 5 = 17  Start at the larger number on the number line and then count on in ones or in one jump to find the answer	5 + 12 = 17 Place the larger number in your head and count on the smaller number to find your answer
Add 3 single digits	4 + 7 + 6 = 17 Combine to make 10 first 	4 + 6 + 7 = Draw a picture representation and regroup to make 10 	 Combine the 2 numbers that make 10 and then add on the rest.

Represent and use number bonds and related subtraction facts within 20	 2 more than 5		Emphasis should be on the language 1 more than 5 is equal to 6 2 more than 5 is 7 8 is 3 more than 5
Adding multiples of 10	50 = 30 + 20 Use dienes 	 3 tens add 5 tens equals 30 + 50 =	20 + 30 = 50 70 = 50 + 20 40 + ☐ = 60
Use known number facts Part whole model	Children explore ways of making numbers within 20 		
Using known facts			3 + 4 = 7 Leads to 30 + 40 = 70 Leads to 300 + 400 = 700

Bar model	 3 + 4 = 7	 7 + 3 = 10	 23 + 25 = 48
Add a 2 digit number and ones	17 + 5 = 22 Use 10 frames to make ten  Children expolre the pattern 17 +5 = 22 27 + 5 = 32 37 + 5 = 42		17 + 5 = 22 Explore facts 17 + 5 = 22 5 + 17 = 22 22 – 5 = 17 22 – 17 = 5 
Add a 2 digit number and tens	Explore that the ones does not change  25 + 10 = 35	 	27 + 10 = 37 27 + 20 = 47 27 + ☐ = 67

Add 2 2 digit numbers	Model using dienes, place value counters and numicon  25 + 47  32 + 14 = 46	47 + 25 = 72 Start with bigger number, partiction the smaller number and add on  47 + 20 = 67 67 + 5 = 72	
Column addition – no regrouping	24 + 15 = Use dienes and then place value counters to model. Add the ones first and then the tens 	Children move to drawing the counters using a tens and ones frame 	2 2 3 + 1 1 4 3 3 7 Add the ones first, then the tens, then the ones.
Column addition - regrouping	39 + 15 =	34 + 17 = Children draw a representation of the grid and carry the ten underneath the line	25 + 48 = Model partitioning the numbers before formal column method 20 + 5 40 + 8 60 + 13 = 73

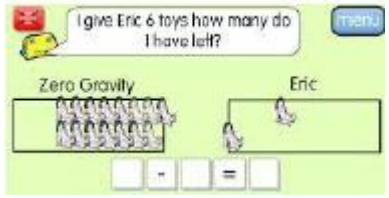
	 Model exchanging 10 ones for a ten using numicon, dienes or place value counters		536 + 85 621 1 1
Estimate the answers to questions and use the inverse to check answers	Estimating 98 + 17 = 100 + 20 = 120 Use dienes, numicon or place value counters	Draw number lines to show estimation 	Building up known facts and using them to illustrate the inverse and check answers 98 + 18 = 116 116 – 18 = 98 18 + 98 = 116 116 – 98 = 18
Add numbers with up to 4 digits	Children continue to use dienes, place value counters to add, exchanging ten ones for a ten, ten tens for a hundred, tens hundreds for a thousand. 	Draw representations using a place value grid 	Continue from previous work to carry hundreds as well a tens 
Add numbers with more than 4 digits Add decimals with 2 decimal places including money	Introduce decimal place value counters and model exchange for addition 	2.37 + 81.79	72.8 + 54.6 127.4 1 1

			
Add several numbers of increasing complexity	As above	As above	Insert zeros for place holders  

EYFS

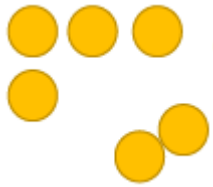
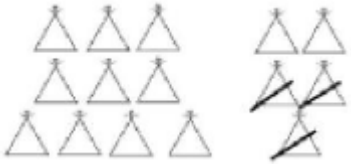
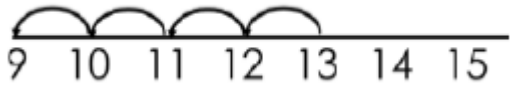
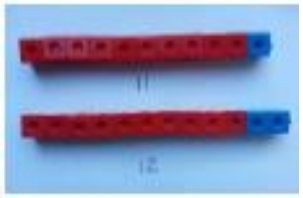
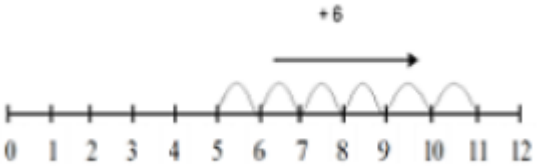
Subtraction

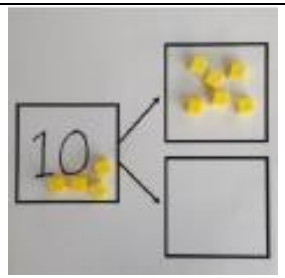
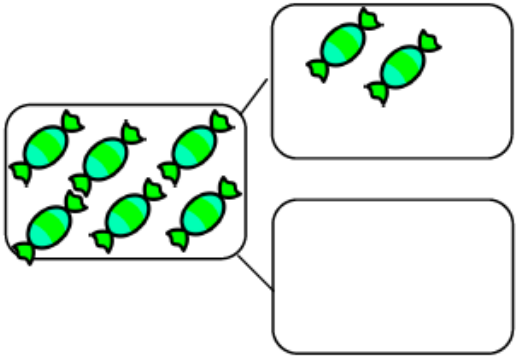
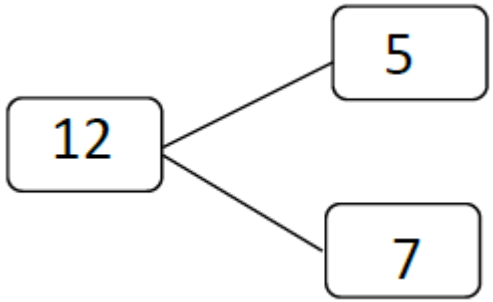
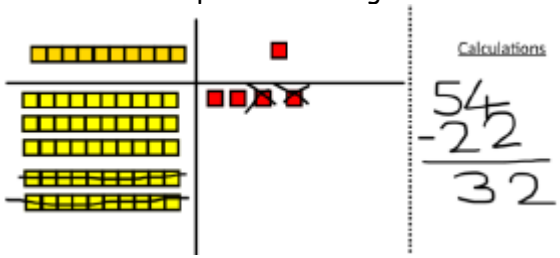
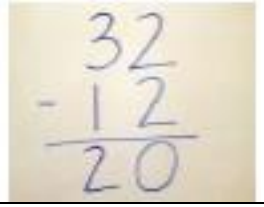
Useful models, guidance and images	Key vocabulary
Concrete apparatus is used to relate subtraction to taking away and counting  how many objects are left. E.G 5 – 2 = Construct number sentences verbally or using cards to go with practical activities.  5 - 1 = 4 Children should be encouraged to read aloud sentences in different ways Five subtract 1 is four, four is equal to five take subtract one, four is the same as five subtract one. Children make a record in pictures, words or symbols of subtraction activities  Solve simple problems using fingers  Number tracks can be introduced to count back and to find one less, what is one less than 9? 1 less than 20?  	Take away Leave Estimate Left Fewer Less Difference between Same as Counting/hopping back How many are left? How many have gone? One less, two less, three less How many fewer is…..?

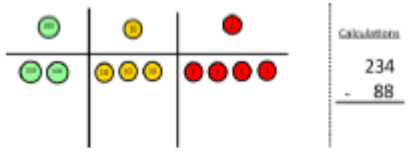
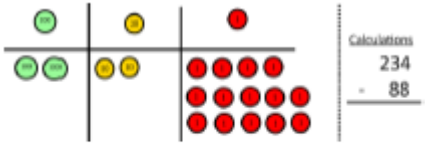
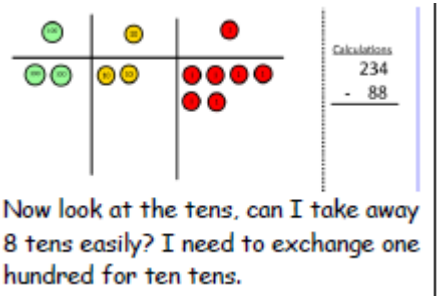
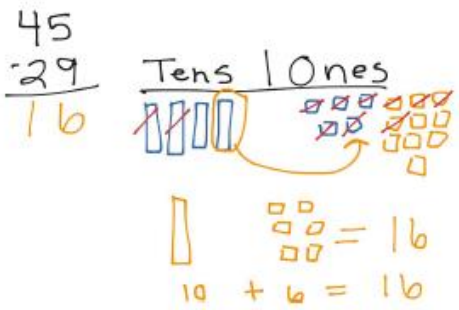
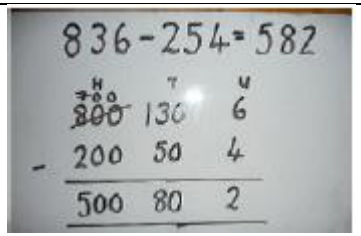
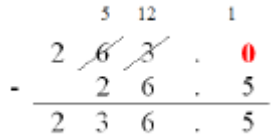
Number lines can be used alongside number tracks and practical apparatus to solve subtraction calculations and word problems. Children count back showing hops back on the number line  	

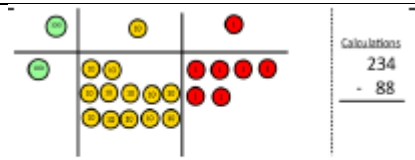
Subtraction

KS1/2

Objective	Concrete	Pictorial	Abstract
Take away ones	Use physical objects, counters, cubes, etc to show how objects can be taken away. 6 - 2 = 4 	Cross out drawn objects to show what has been taken away 15 – 3 = 12 	18 – 3 = 15 8 – 2 = 6
Counting back	Move objects away from the group as you count back 7 – 2 = 5 	Count back on a number line 13 – 4 = 9  Start at the bigger number and count back the smaller number showing the jumps on the number line	Put 13 in your head and count back 4. What number are you at? Use your fingers to help
Find the difference	Compare objects and amounts  Use cubes or build towers to make bars to find the difference	Count on using a number line to find the difference 	Hannah has 23 sandwiches, Helen has 15 sandwiches. Find the difference between the number of sandwiches.

	12 is 1 more than 11		
Part part whole model	 Link to addition, use the part whole model to show the inverse between addition and subtraction If 10 is the whole and 6 is one of the parts, what is the other part? 10 – 6 =	Use pictorial representations to show the part 	Move to using numbers within the representation  Include missing number problems 12 - ? = 5 7 = 12 - ?
Column method without regrouping	Use base 10/dienes to make the larger number and then take the smaller number away. 	Draw the base 10 alongside the written calculation to help show working out. 	47 – 24 = 7 – 4 = 40 – 20 = This will lead to a clear written method 

Column method with regrouping	Use base 10 or numicon to model exchanging a ten for ten ones first. Use exchanging a ten before progressing to exchanging a hundred or thousand Make the larger number with place value counters or base 10  Start with the ones, can I take away 8 from 4 easily? I need to exchange one of my tens for ten ones.  Now I can subtract my ones.  Now look at the tens, can I take away 8 tens easily? I need to exchange one hundred for ten tens.	 Children may draw base ten showing the exchange and cross off what is being taken away When confident children will find their own way of showing the exchange	 Partition into place value columns Children will move to a more compact method and will lead to an understanding of subtracting any number including decimals. 

	 Now I can take away eight tens and complete my subtraction Show children how the concrete method links to the written method alongside your working. Cross out your numbers when exchanging and show where to write the new numbers		

EYFS

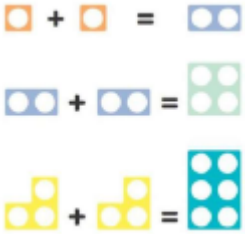
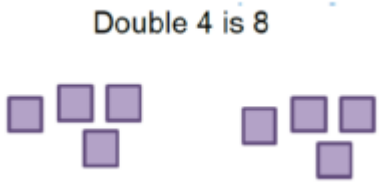
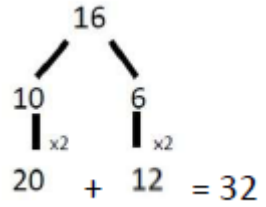
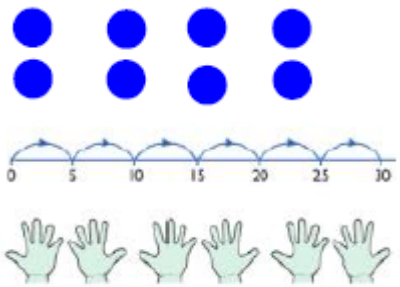
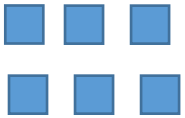
Multiplication

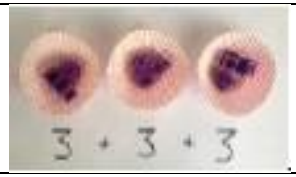
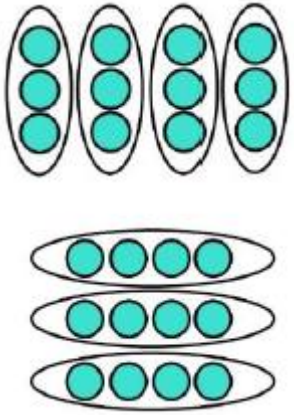
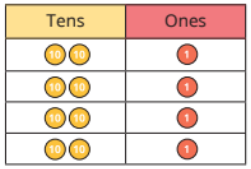
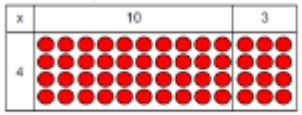
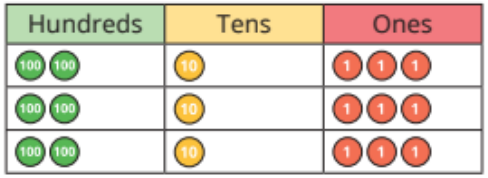
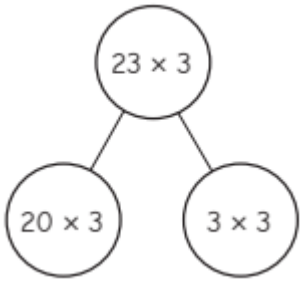
Guidance, models and images	Key vocabulay
The link between addition and multiplication can be introduced through doubling. Numicon can be used to visualise the repeated adding of the same number.  Children can record this by drawing around or printing the piece Begin with mostly concrete or pictorial representations  How many groups of 2? 2 + 2 + 2 + 2 + 2, so 5 groups of 2 Use real life contexts and use of practical equipment to count in repeated groups of the same size   How many wheels altogether? How maych money do I have? Count in 2s, 5s, and 10s both aloud and with objects 	Lots of, groups of, multiplied, multiplied by Multiple of Once, twice, three times …times as …(big, wide, long…) Repeated addition Double Estimate Add again and again

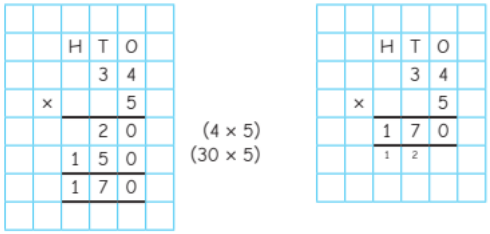
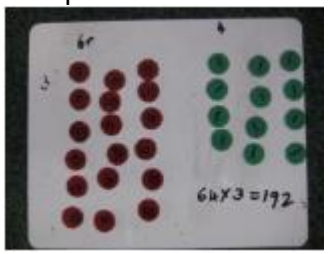
Give children multiplication problems set in real life contexts. Encourage them to visualise the problem using contrete materials or by drawing pictures. E.G how many fingers on two hands?  How many sides on 3 triangles?  How many legs on four ducks?  Children should be encouraged to read number sentences aloud in different ways. 'five times two makes ten' 'ten is equal to five multiplied by two' 'ten is the same as five lots of two'	

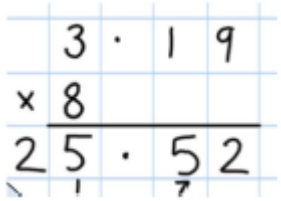
KS1/2

Multiplication

	Concrete	Pictorial	Abstract
Doubling	Using practical activities and objects such as cubes or numicon demonstrate doubling 	Draw pictures to show how to double numbers Double 4 is 8 	Partition a number and then double each part before recombining it back together 
Counting in multiples	Count in multiples supported by concrete objects and equal groups 	Use a number line or pictures to continue support in counting in multiples 	Count in multiples of a number aloud. Write sequences with multiples of numbers 2,4,6,8, 5,10,15,20
Making equal groups and counting the total	Use objects to create equal groups 	Draw pictures to show 2 x 3 = 6 	2 x 4 = 8
Repeated addition	Use different objects to add equal groups 3 + 3 + 3 =	Use pictures including number lines to solve problems There are 2 plates with 3 star biscuits on each plate, how many biscuits in total? 	Write addition sentences to describe objects and pictures  2 + 2 + 2 + 2 + 2 =

			
Understanding arrays Show commutative multiplication	Use objects laid out in arrays to find the answer to 2 lots of 5, 3 lots of 2 etc 	Draw representations of arrays to show understanding 	Use an array to write multiplication sentences and reinforce repeated addition.  5 + 5 + 5 = 15 3 + 3 + 3 + 3 + 3 = 15 5 x 3 = 15 3 x 5 = 15
Use place value charts for multiplication	 3 tens × 2 = ____ tens 2 ones × 2 = ____ ones ____ + ____ = ____ 32 × 2 = ____  2 tens × 4 = ____ tens 1 one × 4 = ____ ones ____ + ____ = ____ 21 × 4 = ____  4 rows of 10 4 rows of 3 answer	Children can represent the work they have done with place value counters in a way they understand. They can draw the counters, using colours to show different amounts, or just circles in different columns to show their thinking. 	 20 × 3 = 60 3 × 3 = 9 23 × 3 = 69 ▸ 32 × 4 = ___ tens × 4 + ___ ones × 4 = ___ + ___ = ___

			 Move forward to the more formal written method Y4 35 X 7 245 3
Column method	Children can continue to be supported by place value counters at this stage of multiplication  It is important at this stage that they multiply the ones first and note down the answer followed by the tens which they note below	Multiplication by partitioning and grid method may be used to show how it links to more formal written method 42x8= 40 x 8 = 320 2 x 8 = 16 320+16 = 336 x 300 20 7 4 1200 80 28	327 x 4 28 80 1200 1308 This leads to more compact method 327 × 4 1308 1 2
Multiplying decimals up to			Remind children that the single digit belongs in the ones cloumn, Line up the

2 decimal places by a single digit			decimal points in the question and the answer 
EYFS			
Division			
Useful guidance, models and images		Key vocabulary	

Solve problems including doubling, halving and sharing.
Show children representations of division as grouping and sharing.
Introduce through **halving**,
e.g concrete and pictorial representations linked to real life.

Grouping
Mum has 6 socks, she grouped them into pairs, How many pairs did she make? How many socks did she have altogether?

Sharing – this is a useful way to introduce children to fractions and calculating with fractions.
I have ten sweets, I want to share them with my friend, how many will we both have?

I have got a whole pizza to share between two people. Can you cut the pizza in half?

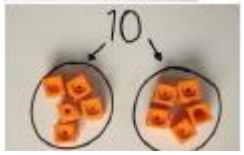
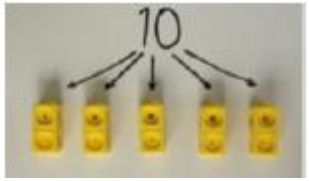
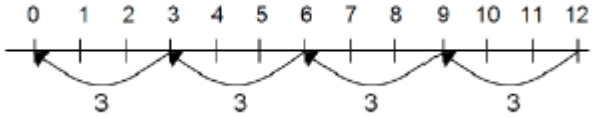
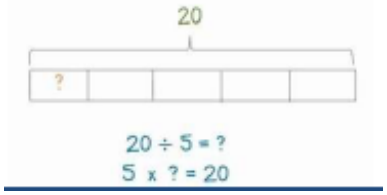
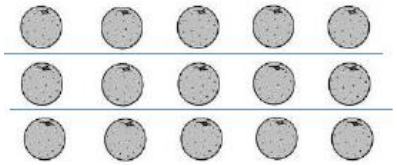
Children can record in pictures, words or symbols.

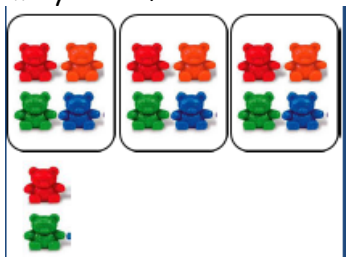
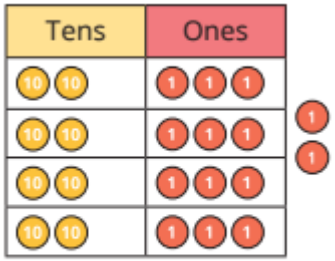
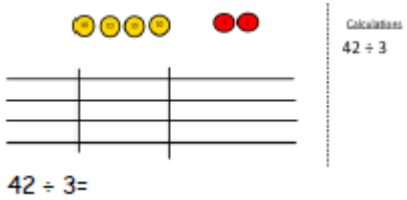
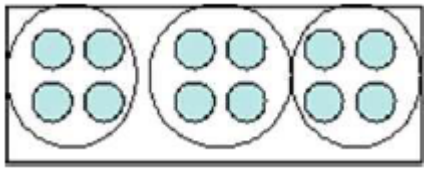
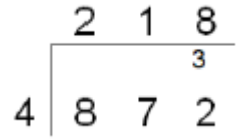
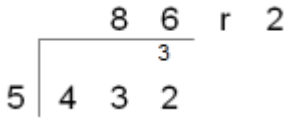
Halve, share, share equally
One each, two each
Group in pairs, threes
Equal groups of
Divide
Divided by
Divided into
Left over
Estimate
Fraction
Half
Halves
Whole
quarter

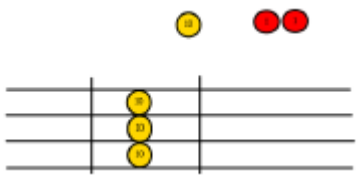
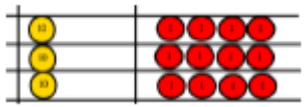
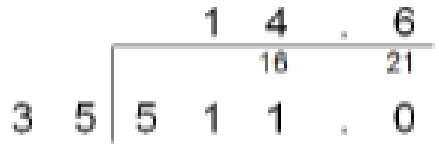
KS1/2

Division

	Concrete	Pictorial	Abstract

Sharing objects into groups	I have 10 cubes can you share them equally into 2 groups?  	Children use pictures or shapes to share quantities  8 ÷ 2 = 4	Share 9 buns between 3 people 9 ÷ 3 = 3
Division as grouping	Divide quantities into equal groups. Use cubes, counters, objects to aid understanding  	Use a number line to show jumps in groups. The number of jumps equal the number of groups  Use a bar model, think of the bar as a whole, split it into the number of groups you are dividing by and work out how many would be in each group.  	28 ÷ 7 = 4 Divide 28 into 7 groups, how many are in each group?
Division within arrays	Link division to multiplication by creating an array and thinking about the number sentence that can be created.  Eg 15 ÷ 3 = 5 5 x 3 = 15 15 ÷ 5 = 3 3 x 5 = 15	Draw an array and use lines to split the array into groups to make division and multiplication sentences 	Find the inverse of multiplication and division sentences by creating four linking number sentences 7 x 4 = 28 4 x 7 = 28 28 ÷ 7 = 4 28 ÷ 4 = 7
Division with remainders	14 ÷ 3 =		Complete written divison and show the remainder using r

	Divide objects between groups and see how many are left over 	Draw dots and then group them to divide an amount and clearly show a remainder   94 ÷ 4 = 23 r2	
Short division	Use place value counters to divide using the bus stop method alongside 96 ÷ 3   42 ÷ 3=	Children can continue to draw dots or diagrams and divide the numbers into equal groups  Encourage them to move towards counting in multiples to divide more efficiently	Begin with divisions that divide equally with no remainder  Move onto divisions with a remainder 

	Start with the biggest place value, we are sharing 40 into 3 groups. We can put 1 ten in each group and we have 1 ten left over  We exchange this ten for 10 ones and then share the ones equally between the groups  We look at how many is in one group and the answer is 14		Finally move into decimal places to divide the total accurately. 

Long division A remainder in the ones	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

A remainder in the tens

1. Divide.	2. Multiply & subtract.	3. Drop down the next digit.
t o 2 2)5 8	t o 2 2)5 8 - 4 1	t o 2 9 2)5 8 - 4 ↓ 1 8
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 & subtract.	3. Drop down the next digit.
t o 2 9 2)5 8 - 4 1 8	t o 2 9 2)5 8 - 4 1 8 - 1 8 0	t o 2 9 2)5 8 - 4 1 8 - 1 8 0
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

A remainder in any of the place values

1. Divide.	2. Multiply & subtract.	3. Drop down the next digit.
h t o 1 2) 2 7 8	h t o 1 2) 2 7 8 - 2 0	h t o 1 8 2) 2 7 8 - 2 ↓ 0 7
Two goes into 2 one time, or 2 hundreds ÷ 2 = 1 hundred.	Multiply 1 × 2 = 2, write that 2 under the two, and subtract to find the remainder of zero.	Next, drop down the 7 of the tens next to the zero.
Divide.	**Multiply & subtract.**	**Drop down the next digit.**
h t o 1 3 2) 2 7 8 - 2 0 7	h t o 1 3 2) 2 7 8 - 2 0 7 - 6 1	h t o 1 3 2) 2 7 8 - 2 0 7 - 6 1 8
Divide 2 into 7. Place 3 into the quotient.	Multiply 3 × 2 = 6, write that 6 under the 7, and subtract to find the remainder of 1 ten.	Next, drop down the 8 of the ones next to the 1 leftover ten.
1. Divide.	**2. Multiply & subtract.**	**3. Drop down the next digit.**
h t o 1 3 9 2) 2 7 8 - 2 0 7 - 6 1 8	h t o 1 3 9 2) 2 7 8 - 2 0 7 - 6 1 8 - 1 8 0	h t o 1 3 9 2) 2 7 8 - 2 0 7 - 6 1 8 - 1 8 0
Divide 2 into 18. Place 9 into the quotient.	Multiply 9 × 2 = 18, write that 18 under the 18, and subtract to find the remainder of zero.	There are no more digits to drop down. The quotient is 139.