Wembdon St George's Church School

BATH & WELLS Multi Academy Trust
'That they may have life, life in all its fullness' John 10:10

Our Learning in Maths 2022-2023

Wembdon St George's Church School Curriculum Intent:

When teaching mathematics at Wembdon St George's, we intend to provide a curriculum which caters for the needs of all individuals and sets them up with the necessary skills and knowledge for them to become successful mathematicians. The focus of our curriculum is for pupils to, know more, remember more and be able to do more in familiar and unfamilar contexts. This enables children to make connections between their developing knowledge of new concepts, prior learning, and helps them to relate to real-life situations in the world around them. A wide range of mathematical resources are used, and pupils are taught to show their workings in a concrete, pictorial and abstract form wherever suitable. They are taught to explain their choice of methods and develop their mathematical reasoning skills. We encourage adaptability and acceptance that struggle is often a necessary step in learning which enables our pupils to be successful.

Wembdon St George's Church School Curriculum Implementation:

At Wembdon, we follow the National Curriculum but use the White Rose curriculum progression document to help support class teachers underpin their planning and teaching. This enables them to carefully plan for an appropriate balance of pictorial and concrete resources, alongside abstract problems, to ensure that all pupils are able to progress within individual lessons, and across a sequence, using mastery approaches. We have adopted a thematic interpretation of Rosenshine's principles of instruction where teachers review materials, use targeted questioning, appropriate sequences, concepts and modelling, and a variety of stages of practice to help reinforce previously taught, and new content. Our curriculum structure and sequences, and our pedagogical approaches are adapted to be ambitious to enable us to meet the needs of pupils with SEND. Ongoing formative assessment practices identify any learning gaps within individual lessons to inform daily feedback and catch-up sessions, allowing all pupils to be ready for the next lesson in the sequence. Summative assessment, and subsequent analysis, is used appropriately to inform planning and teaching. At Wembdon, we recognise the importance of core number facts, this are taught using: web-based programmes, daily retrieval practice and explicit teaching. The classroom environment effectively supports pupils to develop their mathematical independence. This includes visual models, vocabulary, and common misconceptions.

Wembdon St George's Church School Curriculum Impact:

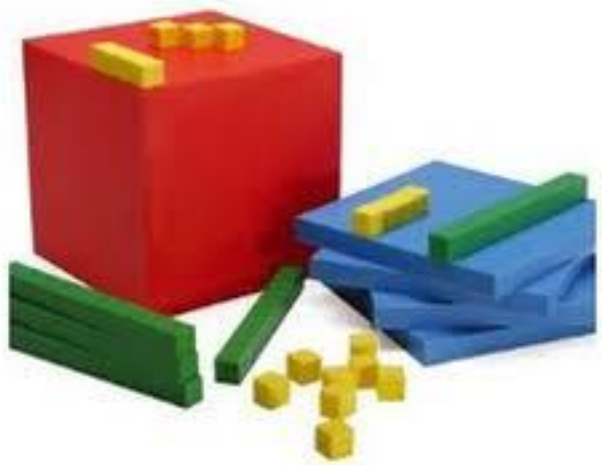
Class teachers are expected to make regular formative evaluations of learning that determine whether pupils are achieving. Teachers seek the advice of colleagues and leaders where individuals, or groups of pupils, are not yet achieving these expectations. Through termly moderation, staff are able to identify children who are not making expected progress, compare groups of children from different classes and ensure that classes are consistent across a year group and school. Regular CPD is provided for all staff during the year and specific CPD/support is given when a need is identified. Summative assessment is used by the Maths Lead and class teachers to measure progress and the data is then used to plan teaching and learning and deliver targeted interventions.

Wembdon St George's

Calculation Policy

Autumn 2022

Curriculum intent: To ensure the children have the skills and knowledge to be able to access real life problems with a zest for enquiry and confidence and through collaboration.



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This policy has been designed to teach children through the use of concrete, pictorial and abstract methods. This calculation policy should be used to support children to develop a deep understanding of number and calculation and acts as a guide for the teaching progression of skills.

Background

This policy has been developed by Maths leads with a specific interest in the use of bar methods to develop number awareness and fluency.

The policy only details the strategies; teachers must plan opportunities for pupils to apply these; for example, when solving problems, or where opportunities emerge elsewhere in the curriculum.

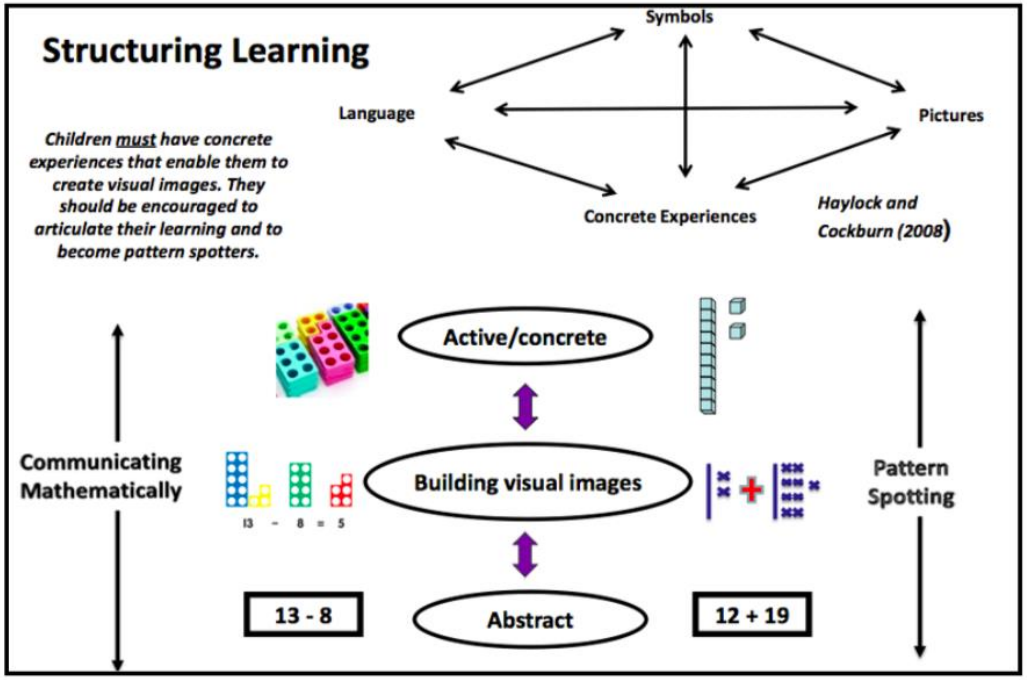
Using the concrete-pictorial-abstract approach:

Children develop an understanding of a mathematical concept through the three steps (or representation) of concrete-pictorial-abstract approach. Reinforcement is achieved by going back and forth between these representations.

Concrete representation The enactive stage - a pupil is first introduced to an idea or a skill by acting it out with real objects. This is a 'hands on' component using real objects and it is the foundation for conceptual understanding.

Pictorial representation The iconic stage - a pupil has sufficiently understood the hands-on experiences performed and can now relate them to representations, such as a diagram or picture of the problem.

Abstract representation The symbolic stage - a pupil is now capable of representing problems by using mathematical notation, for example: $12 \div 2 = 6$.



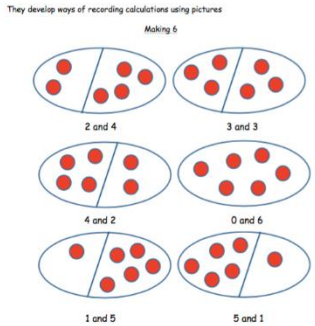
Guidance

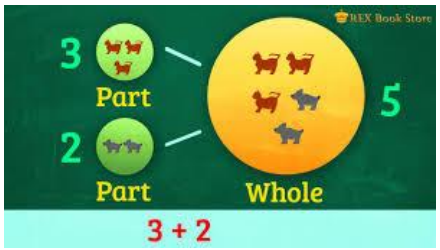
This is document provides guidance and examples for key objectives for each year group but is not to be followed as a complete planning aid as not all objectives are exemplified.

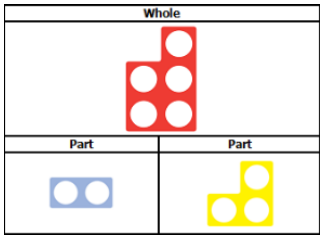
Reception

Addition

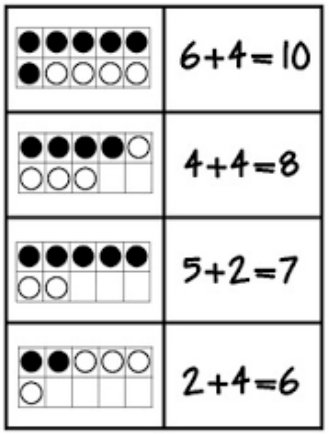
Explore part part whole relationship





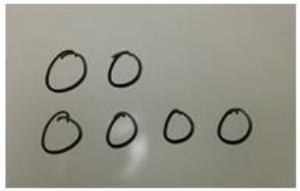


Using the ten frame to support addition of single digits – counting all/combining two groups



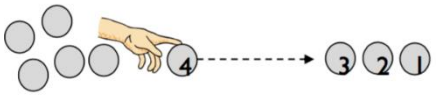
Solving problems using concrete and pictorial images.

Sara has 2 apples.
Jon has 5 apples.
How many apples do they have altogether?
How many more apples does Jon have than Sara?

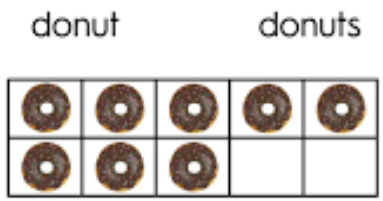


Subtraction

Taking away after counting out practical equipment. . Children would be encouraged to physically remove these using touch counting.



By touch counting and dragging in this way, it allows children to keep track of how many they are removing so they don't have to keep recounting. They will then touch count the amount that are left to find the answer.

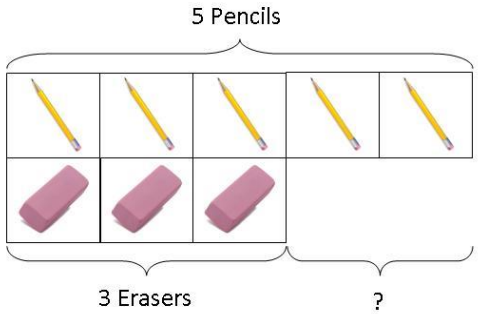


$8 - 4 = __$

Those who are ready may record their own calculations

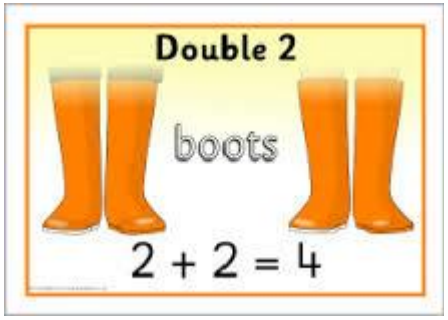
0	1	2	3	4	5	6	7	8	9	10

Using the ten frame to support subtraction by taking away



- Peter has 5 pencils and 3 erasers. How many more pencils than erasers does he have?
  Solving problems using concrete and pictorial images.

Multiplication



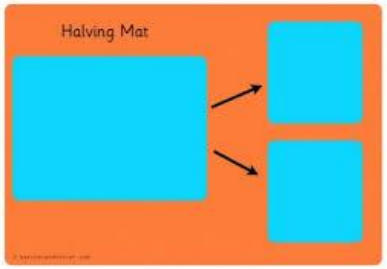
Children will experience equal groups of objects.

They will work on practical problem solving activities involving

There are 6 pairs of socks. How many socks are there altogether?

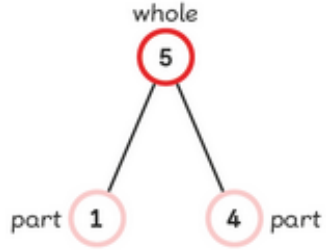
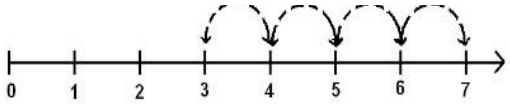
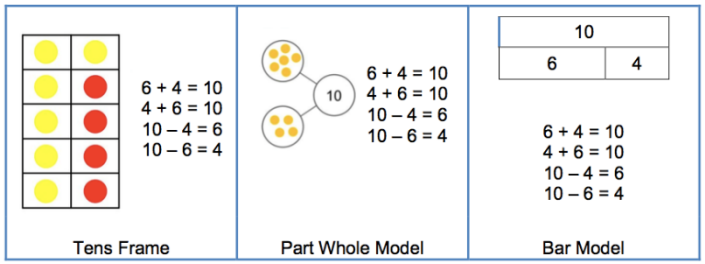
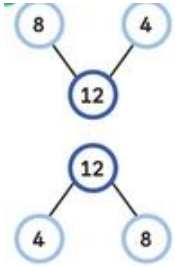
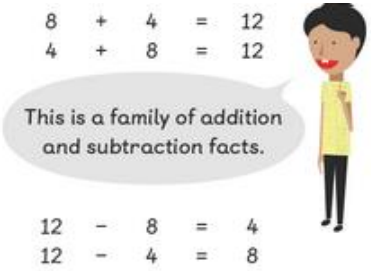
Division

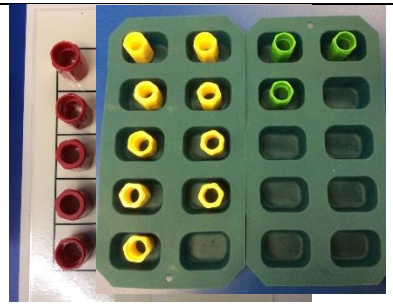
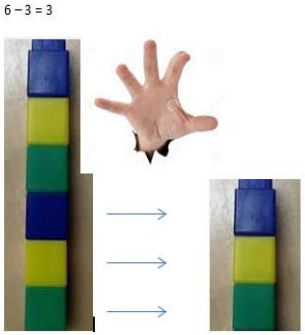
Half is...
5
10

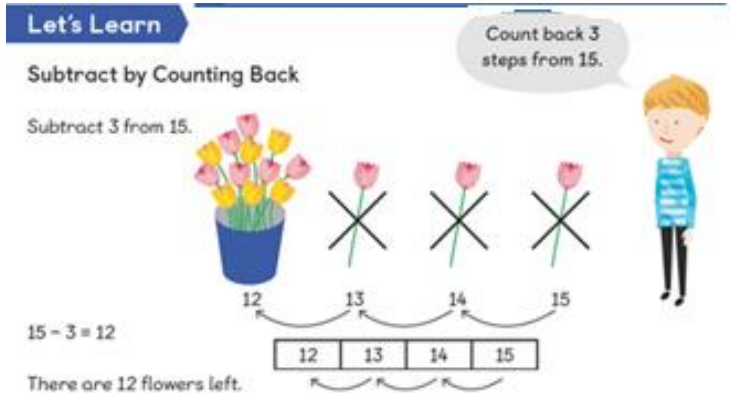

Halving Mat

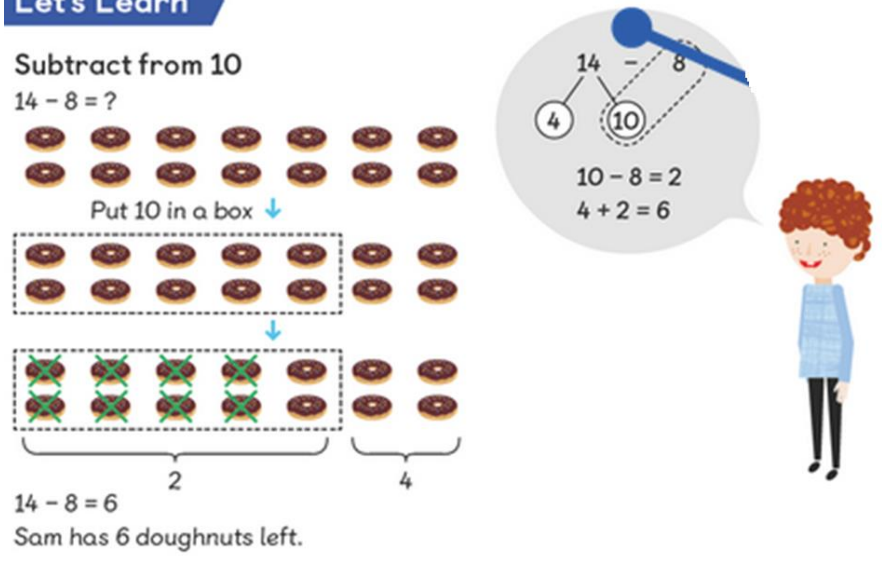
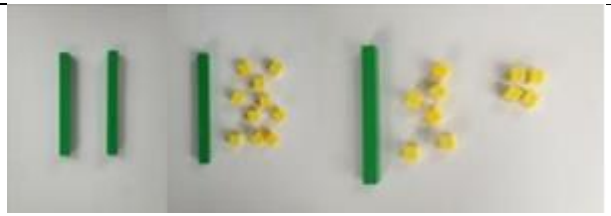
Year 1

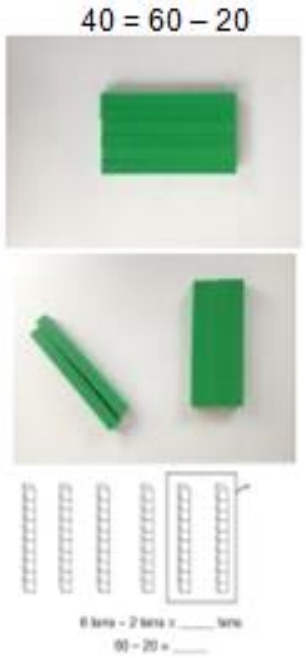
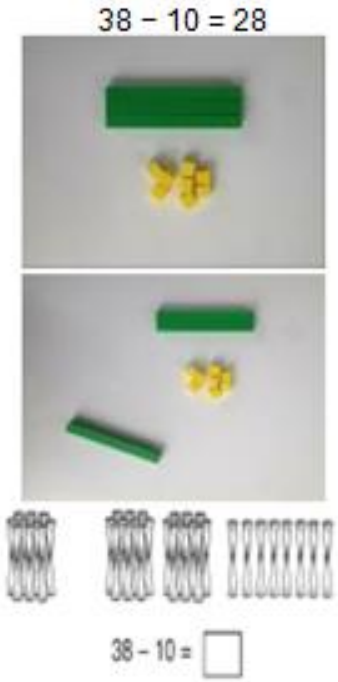
Addition

Joining two groups and then recounting all objects using one-to-one Correspondence (lots of practice making 10 and numbers to 10 e.g. 6 + 4 = 10 or 3 + 5 = 8)	3 + 4 = 7  
Learn number bonds to 20 and demonstrate related facts *Teach addition and subtraction alongside each other as pupils need to see the relationship between the facts.*	  
Add and subtract one digit numbers and two digit	8+1=9

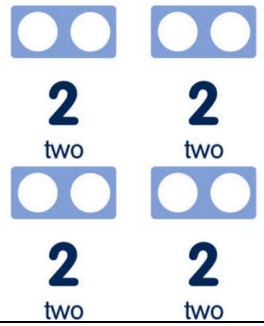
numbers to 20, including zero	
Bridging 10 Use ten frames, Singapore bars, egg boxes and number lines to practice. *Chn should start with the larger number and add the smaller number seeing what makes ten and what is left over.*	 6 + 6 = 12 Make 9 in one and 3 in the other. Take one from the 3 to make the 9 into a ten….10+2 = 12
Subtraction	
Taking away should begin with **physical objects**: objects, cubes, Dienes etc	

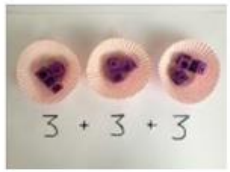
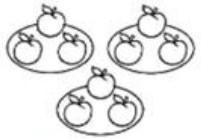
Subtraction by counting back	
Subtracting a single digit number from a single digit number and a single digit from a two digit by crossing out pictures	
Subtracting using the part part whole (include problem solving with missing digits). ? - 5 = 2	
Subtraction by subtracting from 10 *Children subtract from 10 and not from ones*	14 – 8 = ?

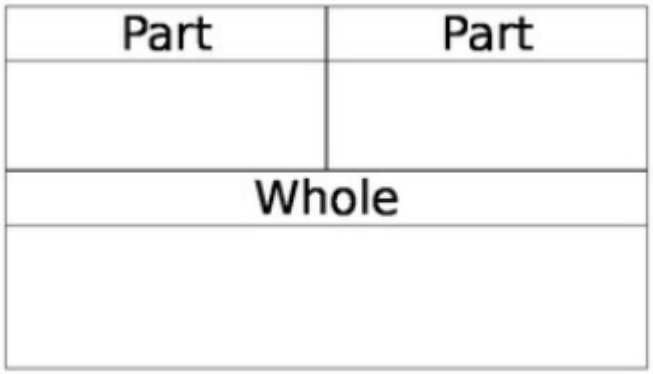
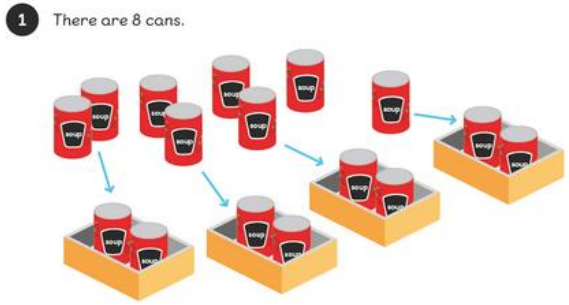
	Let's Learn **Subtract from 10** 14 – 8 = ? 
When subtracting using Dienes children should be taught to regroup a ten rod for 10 ones and then subtract from those ones	 20 – 4 = 16

Subtracting multiples of 10 *Using the vocabulary of 1 ten, 2 tens etc alongside 10, 20, 30 Is very important here as pupils need to understand that it is a 10 not a 1 that is being taken away*	 

Multiplication

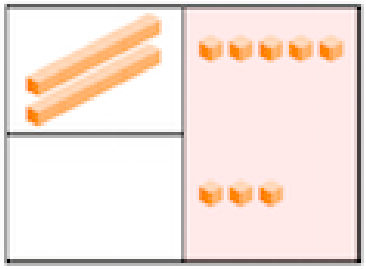
Counting in multiples of 2, 5 and 10 from zero *Children should count the number of groups on their fingers as they are skip counting.*	*2* *4* *6* *8* 4 groups of 2 = 8  2 × 4 = 8
When moving to pictorial/written calculations the vocabulary is important	 This image represents two groups of 4 or 4 twice

Solving multiplication problems using repeated addition	  How many apples are there altogether? 3 + 3 + 3 = 9
Division	

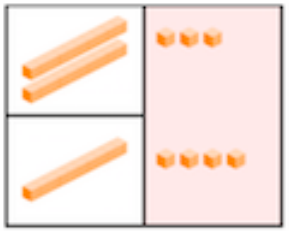
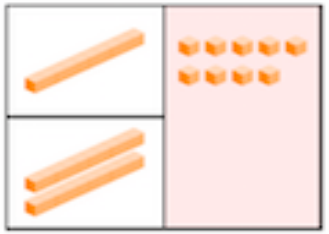
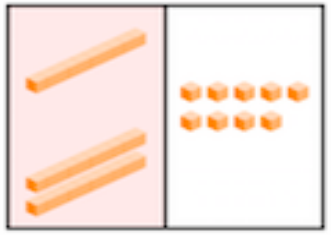
Pupils should be taught to divide through working practically and the sharing should be shown below the whole to familiarize children with the concept of the whole. *The language of whole and part part should be used.*	10 ÷ 2 = 5  8 ÷ 4 = 2 

Year 2

Addition	
Using concrete objects and pictorial representations to add a 2 digit number with a 1 digit number.	



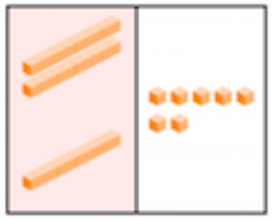
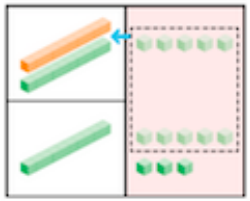
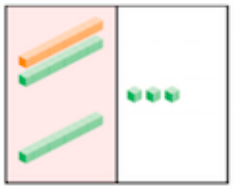
tens	ones
2	5
+	3
	8

Using concrete objects and pictorial representations to add a 2 digit number and 10s number.	Step 1 Add the ones. 3 ones + 4 ones = 7 ones  Step 1 Add the ones.  Step 2 Add the tens. 1 ten + 2 tens = 3 tens  19 + 20 = 39

	tens	ones
	2	3
+	1	4
		7

	tens	ones
	1	9
+	2	0
		9

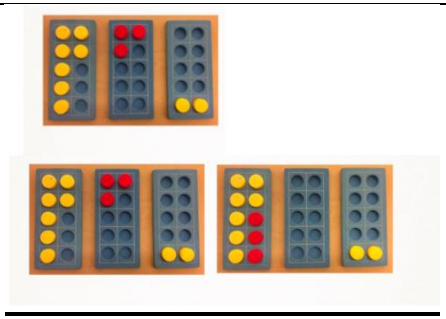
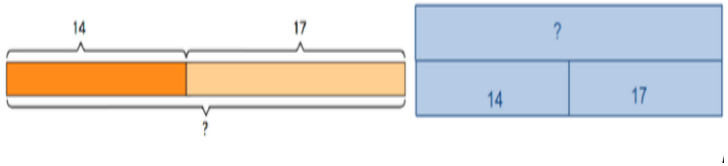
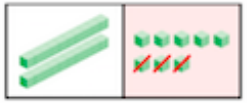
	tens	ones
	1	9
+	2	0
	3	9

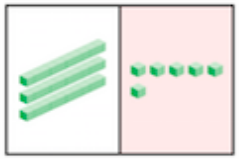
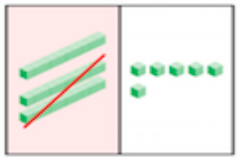
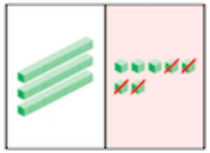
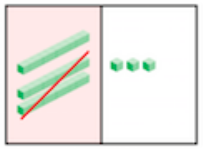
Using concrete objects and pictorial representations to add a 2 2 digit numbers.	Step 2 Add the tens. 2 tens + 1 ten = 3 tens  23 + 14 = 37 Adding with renaming Add 15 and 18. Use to help you add. Step 1 Add the ones. 5 ones + 8 ones = 13 ones Regroup the ones. 13 ones = 1 ten and 3 ones  Step 2 Add the tens. 1 ten + 1 ten + 1 ten = 3 tens  15 + 18 = 33
Using concrete objects and pictorial representations to	7+3+2 = leads to 10 + 2 =

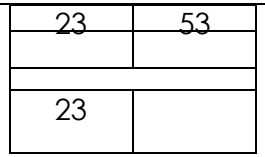
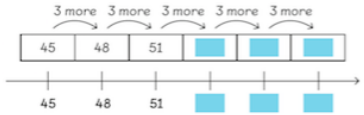
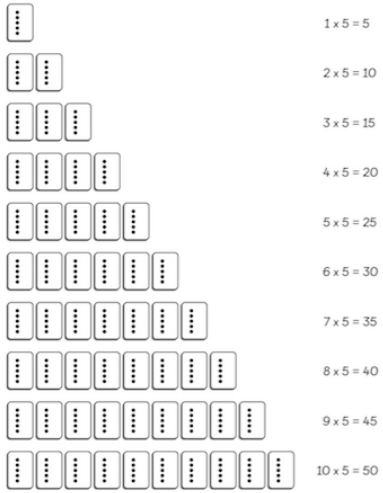
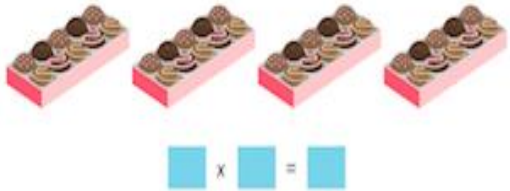
	tens	ones
	2	3
+	1	4
	3	7

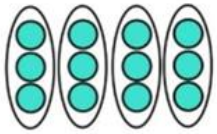
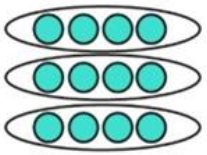
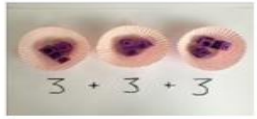
	tens	ones
	1	5
+	1	8
	1	3

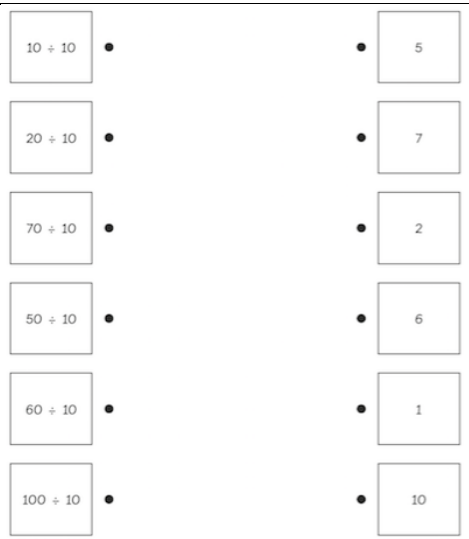
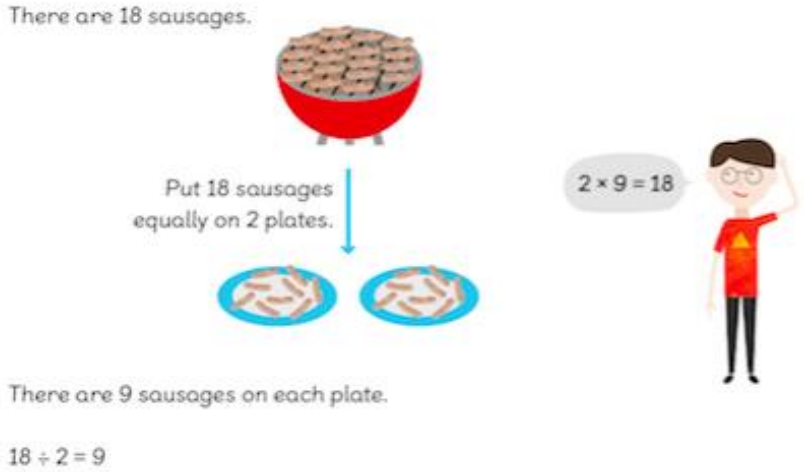
	tens	ones
	1	5
+	1	8
	1	3
+	2	0
	3	3

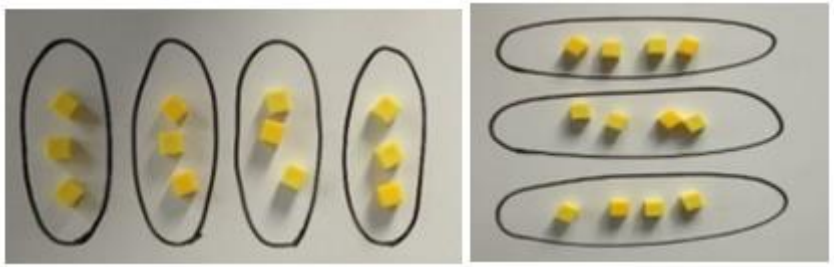
add a 3 single digit numbers.	
Using the bar to find missing digits. *It is important for children to use the bar in this way to encourage the use of it to aid with problem solving.*	Helen has 14 bread-sticks. Her friend has 17. How many do they have altogether? 
Subtraction	
Using concrete objects and pictorial representations to subtract a 1 digit number from 2 digit number.	Step 1 Subtract the ones. 8 ones − 3 ones = 5 ones  tens ones 2 8 − 3 5 Step 2 Subtract the tens. tens ones 2 8 − 3 2 5 28 − 3 = 25

Using concrete objects and pictorial representations to subtract a 10s number from 2 digit number.	Step 1 Subtract the ones.  tens ones 3 6 − 2 0 6 Step 2 Subtract the tens. 3 tens − 2 tens = 1 ten  tens ones 3 6 − 2 0 1 6 36 − 20 = 16
Using concrete objects and pictorial representations to subtract a 2 digit number from 2 digit number.	Subtract 24 from 37. Use ▭ to help you subtract. Step 1 Subtract the ones. 7 ones − 4 ones = 3 ones  tens ones 3 7 − 2 4 3 Step 2 Subtract the tens. 3 tens − 2 tens = 1 ten  tens ones 3 7 − 2 4 1 3 37 − 24 = 13
Recognise and use the inverse relationship between	?

addition and subtraction	 Use this to check calculations and solve missing number problems.
Multiplication	
Skip counting in multiples of 2, 3, 5, 10 from 0	
Recall and use multiplication facts for the multiplication tables 2, 5 and 10.	
I can use multiplication (x) and equal (=) sign when writing out my times tables.	

Multiplication is commutative *Pupils should understand that an array can represent different equations and that, as multiplication is commutative, the order of the multiplication does not affect the answer.*	How many dots are there? 2 x 5 = 10 5 x 2 = 10 2 × 5 is equal to 5 × 2.  12 = 3 × 4  12 = 4 × 3
Solve multiplication problems in context using arrays and repeated addition	 3 x 5 = 5 x 3 =  3 + 3 + 3 = 9
Division	

Recall and use division facts for the multiplication tables 2, 5 and 10.	
Solve division problems in context using concrete objects by sharing	

Solve division problems in context using arrays	
I can solve division as grouping.	Put 10 buns in groups of 2. How many plates are there? Put into groups of 5. There are ▭ groups.

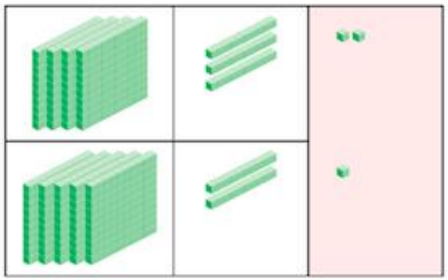
I can use the inverse. This should be taught alongside both multiplication and division.	Make a family of multiplication and division facts. $2 \times 10 = 20$ ——— $20 \div 10 =$ ☐ $10 \times 2 = 20$ ——— $20 \div 2 =$ ☐

Year 3

Addition	
Add two three digit numbers. *Children need to use equipment first to support their understanding of place value.* *Children to word gradually to three digit + three digit starting without carrying and gradually moving towards carrying.*	432 + 521 =

Step 1 Add the ones.

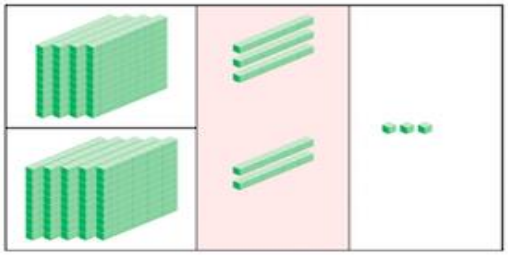
2 ones + 1 one = 3 ones



	h	t	o
	4	3	2
+	5	2	1
			3

Step 2 Add the tens.

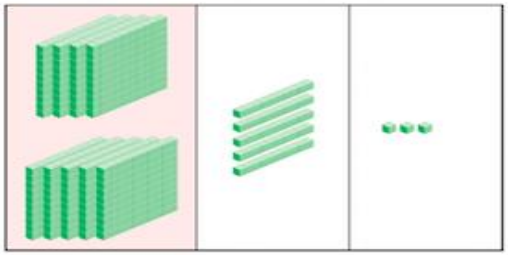
3 tens + 2 tens = 5 tens



	h	t	o
	4	3	2
+	5	2	1
		5	3

Step 3 Add the hundreds.

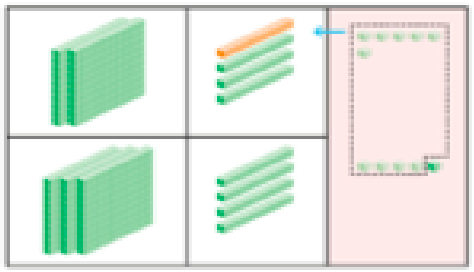
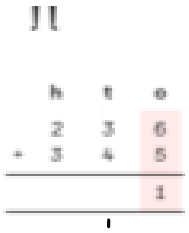
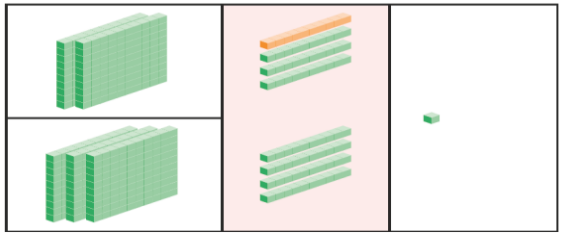
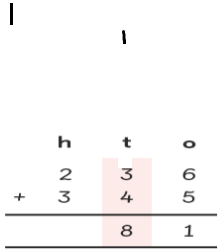
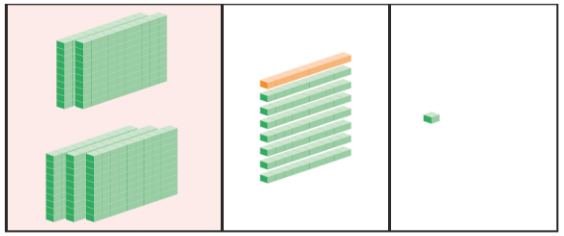
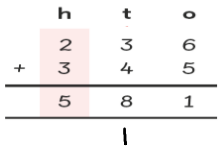
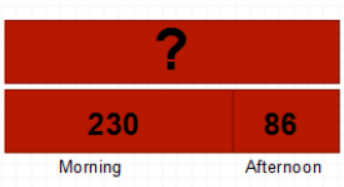
4 hundreds + 5 hundreds = 9 hundreds



	h	t	o
	4	3	2
+	5	2	1
	9	5	3

432 + 521 = 953

There are 953 flowers altogether.

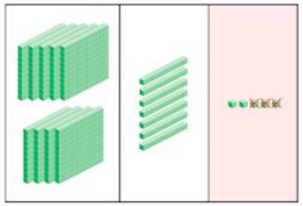
	236 + 345 =   Step 2 Add the tens. 1 ten + 3 tens + 4 tens = 8 tens   Step 3 Add the hundreds. 2 hundreds + 3 hundreds = 5 hundreds   236 + 345 = 581
Using the bar to find missing digits. *It is important for children to use the bar in this way to encourage the use of it to aid with problem solving.*	**Bar Model to support understanding of problem solving:** A man sold 230 balloons at a carnival in the morning. He sold another 86 balloons in the evening . How many balloons did he sell in all?  ? 230 86 Morning Afternoon

Subtraction	

Subtract up to 3 digits from 3 digits. *Very important for children to use dienes equipment along with a place value chart to support.*	Only when secure with the method should exchanging be introduced.

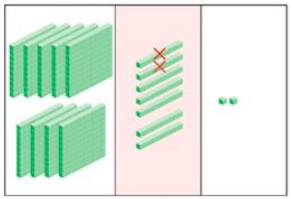
Subtract 723 from 975.

Step 1 Subtract the ones.
5 ones − 3 ones = 2 ones



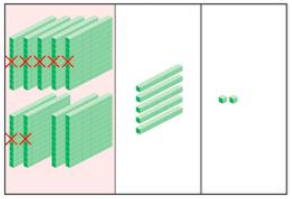
h	t	o
9	7	5
− 7	2	3
		2

Step 2 Subtract the tens.
7 tens − 2 tens = 5 tens



h	t	o
9	7	5
− 7	2	3
	5	2

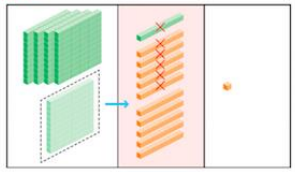
Step 3 Subtract the hundreds.
9 hundreds − 7 hundreds = 2 hundreds



h	t	o
9	7	5
− 7	2	3
2	5	2

975 − 723 = 252

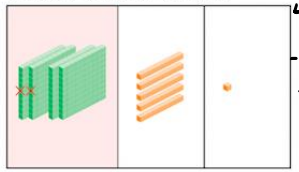
Step 2 Regroup 1 hundred into 10 tens.
Subtract the tens.
11 tens − 6 tens = 5 tens



H T O

3 4 11 2 10
− 2 6 9
1 5 1

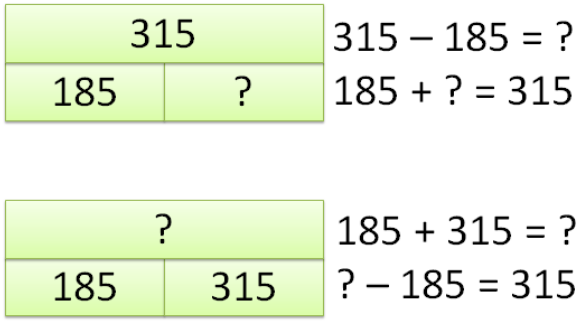
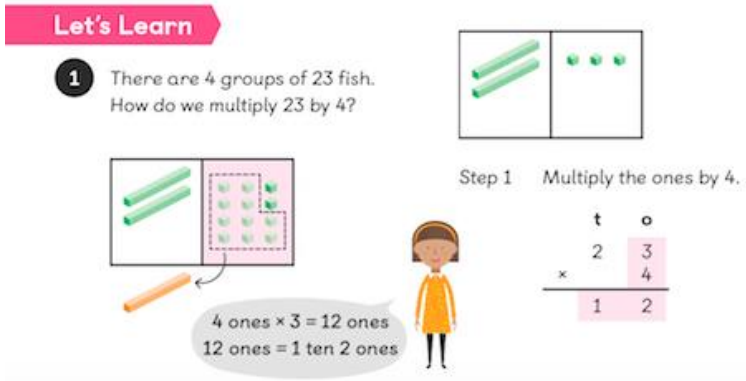
Step 3 Subtract the hundreds.
4 hundreds − 2 hundreds = 2 hundreds

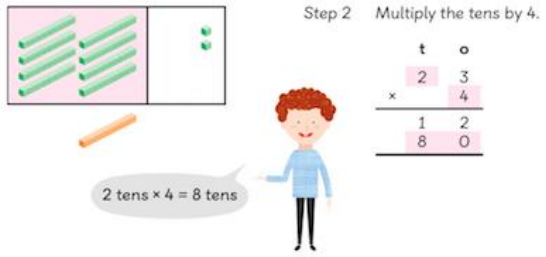
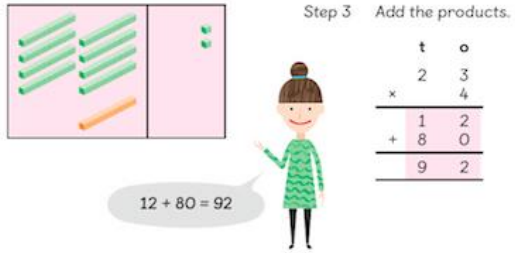
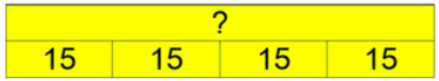


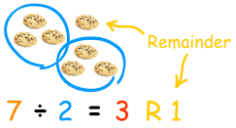
H T O

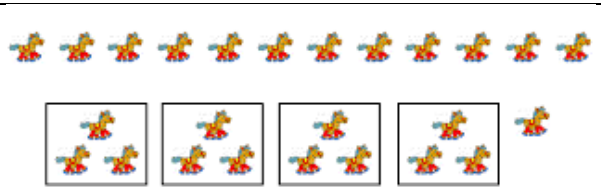
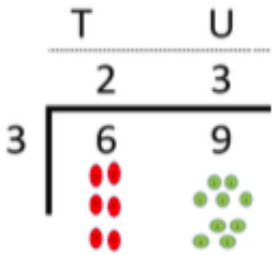
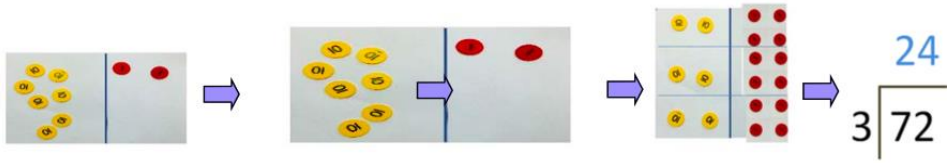
4 5 11 2 10
− 2 6 9
2 5 1

520 − 269 = 251

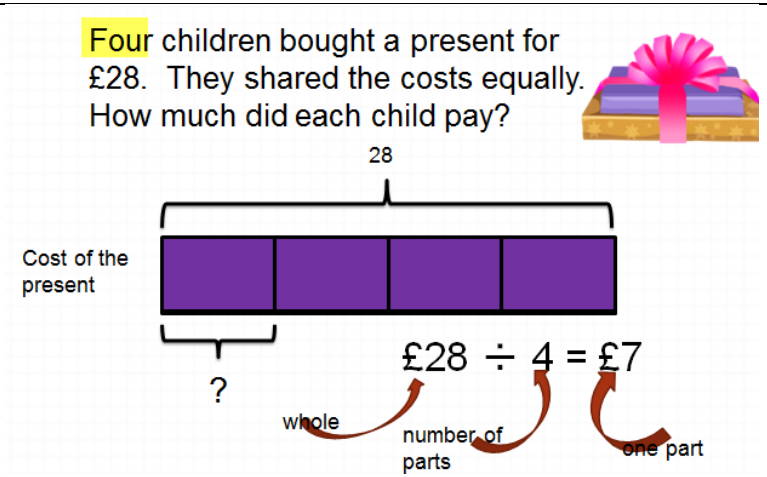
Using the bar to find missing digits. *It is important for children to use the bar in this way to encourage the use of it to aid with problem solving.*	
Multiplication	
Children should be able to recall the 2, 5, 10, 3, 4 and 8 times tables. Multiple a two digit number by a one digit.	

	  23 × 4 = 92 There are 92 fish in 4 tanks.
Using the bar to solve multiplication problems.	4 children go to the cinema. They each pay £15. How much do they spend altogether? Whole unknown 
Division	
Dividing by grouping undrestanding the concept of remainders.	Start with using the real objects-or objects that represent the calculation.

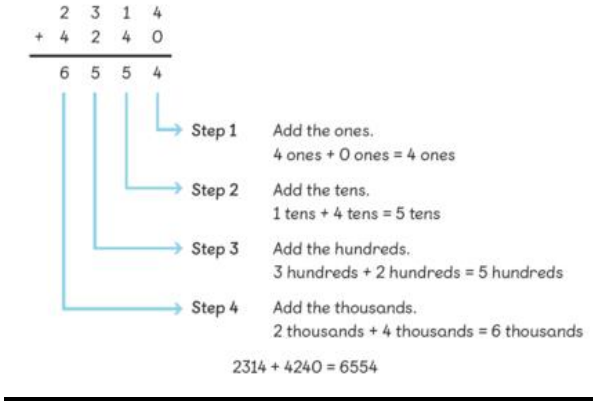
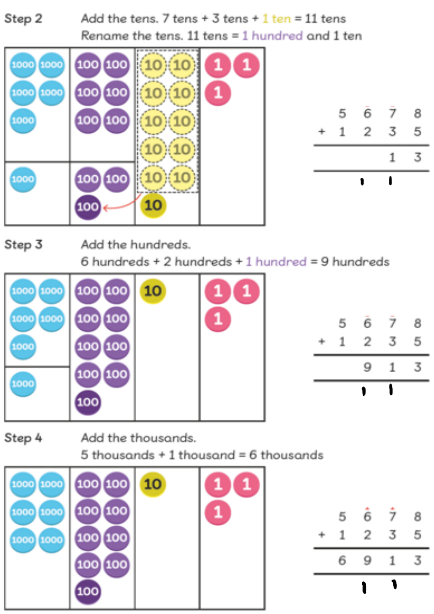


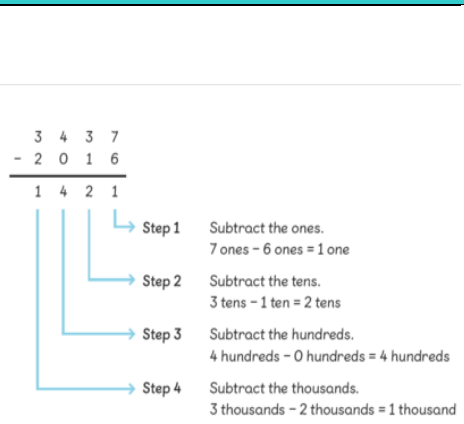
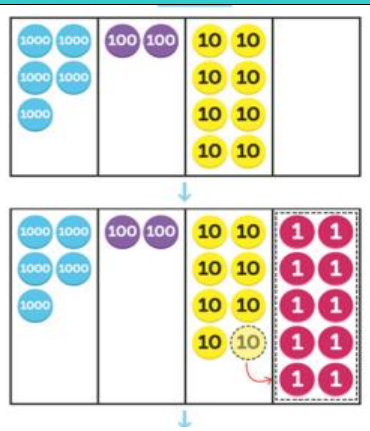
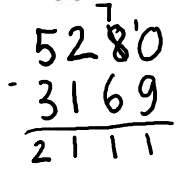
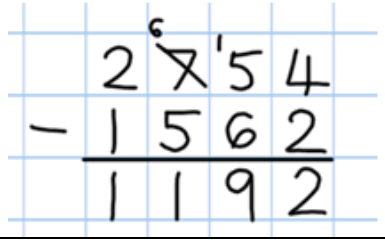
	 13 ÷ 4 = 3 Remainder 1
Dividing using short division. *Once children are secure with division as grouping and demonstrate this using number lines, arrays etc., **short division** for larger 2-digit numbers should be introduced, initially with carefully selected examples requiring no calculating of remainders at all. Start by introducing the layout of short division by comparing it to an array.*	 **Remind children of correct place value, that 69 is equal to 60 and 9, but in short division, pose:** · *How many 3's in 6? = 2, and record it above the **6 tens**.* · *How many 3's in 9? = 3, and record it above the **9 ones**.* Once children demonstrate a full understanding of remainders, and also the short division method taught, they can be taught how to use the method when remainders occur within the calculation (e.g. 72÷3), and be taught to 'carry' the remainder onto the next digit. 

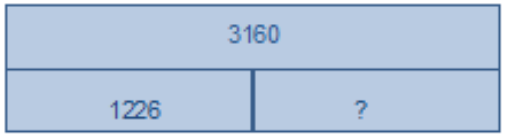
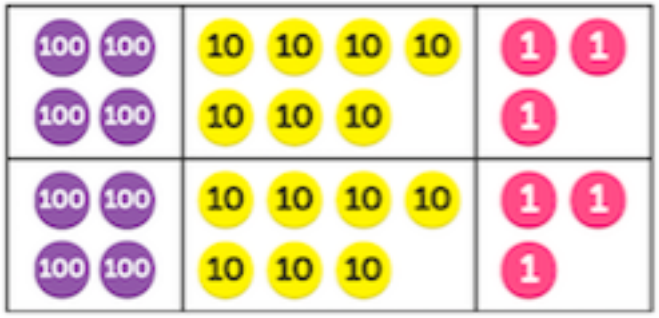
Year 4

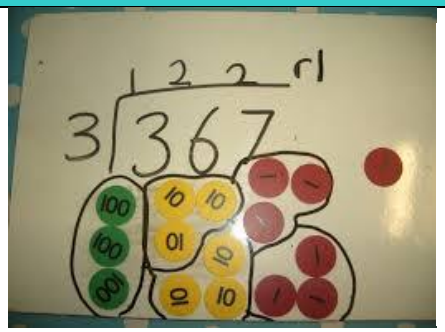
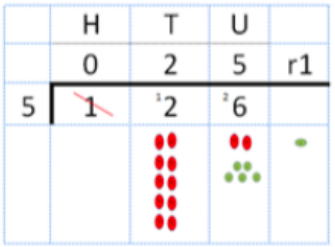
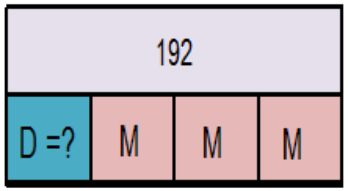
Using the bar to aid the solving of division problems.	

Addition

Adding numbers with up to 4 digits. *Again this should start with the children using dienes to support them with lots of discussion about the value of each digit.*	 

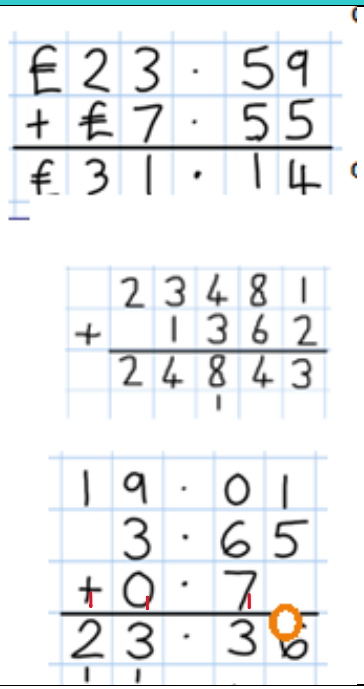
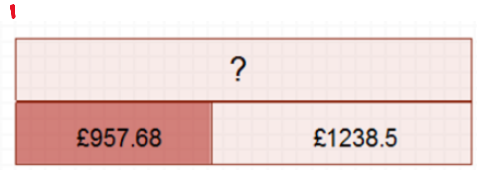
Using the bar to find missing digits. *It is important for children to use the bar in this way to encourage the use of it to aid with problem solving.*	This is not a form of getting the correct answer but helping to guide children to the correct operation. Alison jogs 6,860 metres and Calvin jogs 5,470 metres. How far do they jog altogether?
Subtraction	
To subtract with numbers up to four digits including exchanging when children are secure. *Again children need to use dienes to support their learning.*	   

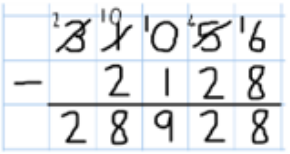
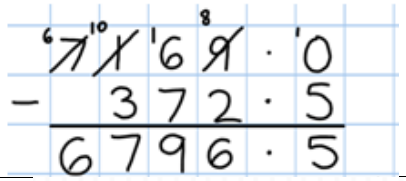
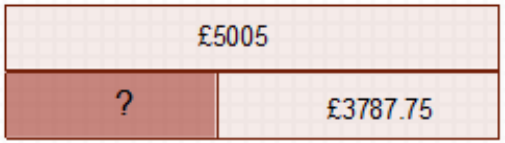
Using the bar to find missing digits. *It is important for children to use the bar in this way to encourage the use of it to aid with problem solving.*	There are 3,160 books in a shop. 1,226 are in English and the rest are in French. How many French books are there? 
Multiplication	
Children to know all times tables to 12 x 12. Ladder method to be used with children multiplying both two and three digits by a one digit number.	3 1 4 × 3 1 2 (3 x 4) 3 0 (3 x 10) + 9 0 0 (3 x 300) 9 4 2  4 7 3 × 2
Multiplying using the bar.	

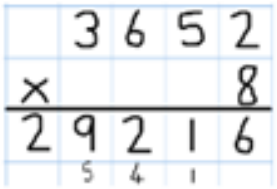
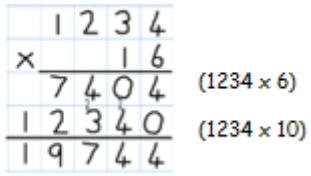
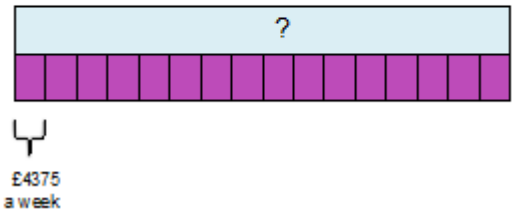
	A computer costs 5 times as much as a television. The television costs £429. How much does the computer cost? Cost of the computer
Division	
Dividing up to three digit numbers by a one digit number using short division. Only when the children are secure with dividing a two digit number should they move onto a 3 digit number.	 
Dividing using the bar.	Desmond and Melissa collect cards. They have 192 cards in all. Melissa has three times as many cards as Desmond. How many cards does Desmond have? 

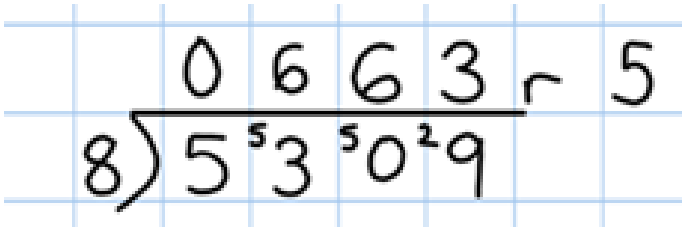
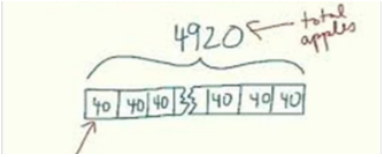
Year 5

Addition

Adding numbers with more than 4 digits including decimals *Using place value charts are key to this as well as place value counters to help with the decimals.*	
Using the bar to find missing digits. *It is important for children to use the bar in this way to encourage the use of it to aid with problem solving.*	This is not a form of getting the correct answer but helping to guide children to the correct operation. MacDonalds sold £9957.68 worth of hamburgers and £1238.5 worth of chicken nuggets. How much money did they take altogether? 

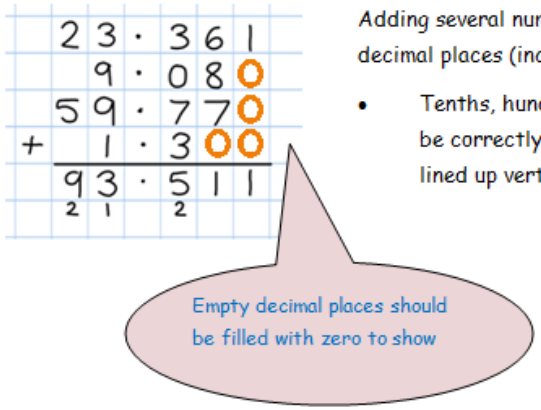
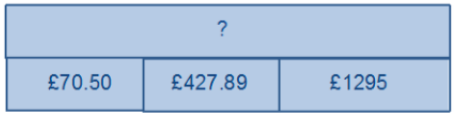
Subtract with at least four digit numbers including two decimal places. *Include money, measures and decimals ensuring that children do this practically before the abstract.*	Subtract with decimal values, including mixtures of integers and decimals, aligning the decimal point.  Approximate, Calculate, Check 
Using the bar to find missing digits. *It is important for children to use the bar in this way to encourage the use of it to aid with problem solving.*	A whole to Lapland costs £5005 for a family of four, the Smith's have only saved £3787.75, how much money do they still need to find? 
Multiplication	
Multiplying up to four digit numbers by two digits using long multiplication. *Children need to be taught to approximate first, e.g. for **72 x 38,***	56 X 27 ——— 392 (56x7) 1120 (56x20) ——— Approximate, Calculate,

they will use rounding: ***72 x 38*** *is approximately 70 x 40 =* ***2800****, and use the approximation to check the reasonableness of their answer.*	1512 · Explain that first we are multiplying the top number by 7 starting with the ones. (any carrying needs to be done underneath the numbers). · Now explain that we need to put a 0 underneath—explain that this is because we are multiplying the number by 20.. (2 tens) which is the same as multiplying 10 and 2. · Now add the 2 numbers together to give you the answer. · This will need lots of modeling to show the children.  
Using the bar to support multiplication.	The cost to run a sports centre is £4375 a week, how much would it cost to run for 16 weeks? 
Division	

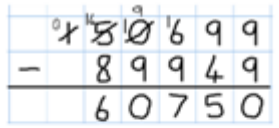
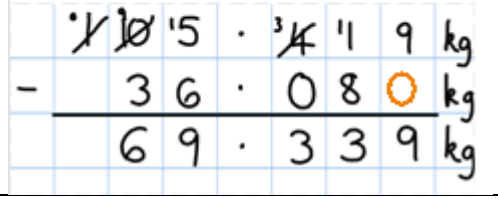
Diving with up to four digit numbers by one digit including numbers where remainders are left.	 **Short division with remainders:** Now that pupils are introduced to examples that give rise to remainder answers, division needs to have a real life problem solving context, where **pupils consider the meaning of the remainder and <u>how</u> to express it,** ie. as a fraction, a decimal, or as a rounded number or value , depending upon the context of the problem.
Using the bar to support division problems.	**<u>Bar Model to support understanding of problem solving:</u>** Frank has 4920 apples. He needs to put them into baskets of 40. How many baskets does he need? 

Year 6

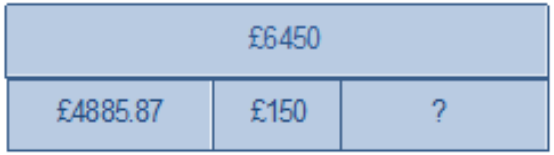
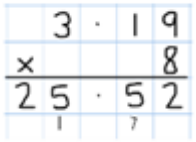
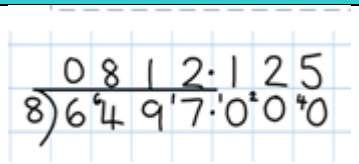
Addition

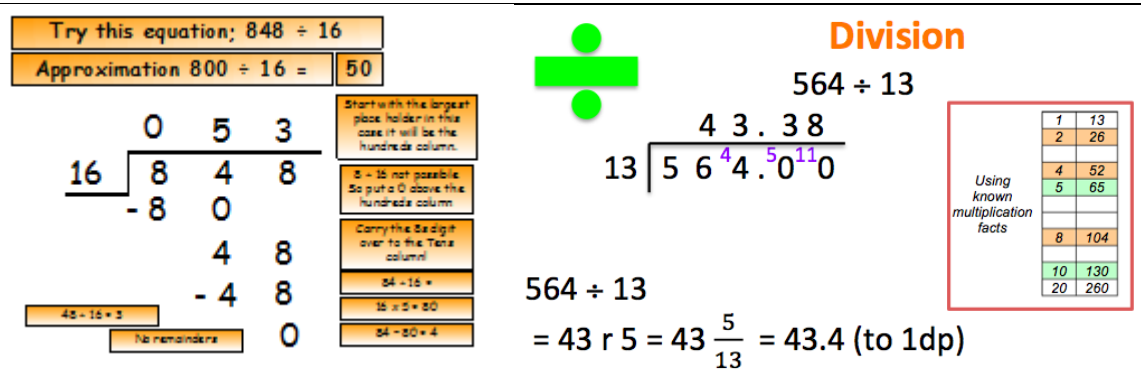
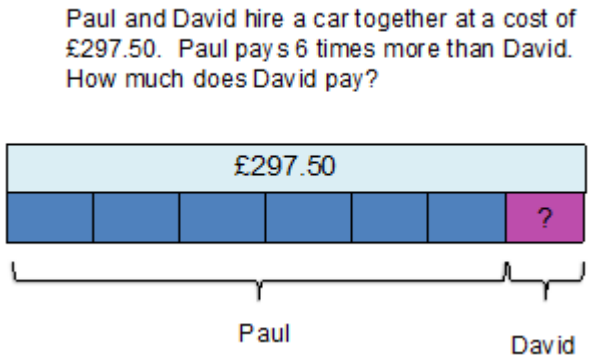
Adding several numbers with up to three decimal places.	 Adding several numbers with different numbers of decimal places (including money and measures): • Tenths, hundredths and thousandths should be correctly aligned, with the decimal point lined up vertically including in the answer row.
Adding using the bar.	Jack went on holiday. His flight cost £70.50, the hotel £1295 and spending money £427.89. How much did Jack spend on his holiday? 

Subtraction

Subtracting with increasingly large and more complex numbers and decimal values.	 

Very important to use in a range of contexts- measures and money.

Using the bar for subtraction.	Chloe wants to buy a new car for £6450. She has £4885.87 in her savings account. Her Dad gives her £150 for her birthday. How much more money does she need to save? 
Multiplication	
Short and long multiplication with up to two decimal places.	 Approximate, Calculate,
Using the bar to help with multiplication.	If 5 friends went on holiday and each paid £579.75 what was the total cost of the holiday? Cost of the holiday
Division	
Divide at least 4 digits by both single-digit and 2-digit numbers (including decimal	 **Short division with remainders:** Pupils should continue to use this method, but with numbers to at least 4 digits, and understand how to express remainders as fractions, decimals, whole number remainders, or rounded numbers. Real life problem solving contexts need to be the starting point, where pupils have to consider the most appropriate way

numbers and quantities)	to express the remainder.
Long division this is for when dividing by two digit numbers.	
Using the bar to help divide.	

Skills progression through the school

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Place Value: Counting	• count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number • Count numbers to 100 in numerals; count in multiples of twos, fives and tens **Autumn 1** **Autumn 4** **Spring 2** **Summer 4**	• count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward **Autumn 1**	• count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number **Autumn 1** **Autumn 3**	• count in multiples of 6, 7, 9, 25 and 1000 • count backwards through zero to include negative numbers **Autumn 1** **Autumn 4**	• count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000 • count forwards and backwards with positive and negative whole numbers, including through zero **Autumn 1**	
Place Value: Represent	• identify and represent numbers using objects and pictorial representations • read and write numbers to 100 in numerals • read and write numbers from 1 to 20 in numerals and words. **Autumn 1** **Autumn 4** **Spring 2** **Summer 4**	• read and write numbers to at least 100 in numerals and in words • identify, represent and estimate numbers using different representations, including the number line **Autumn 1**	• identify, represent and estimate numbers using different representations • read and write numbers up to 1000 in numerals and in words **Autumn 1**	• identify, represent and estimate numbers using different representations • read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value **Autumn 1**	• read, write, (order and compare) numbers to at least 1 000 000 and determine the value of each digit • read Roman numerals to 1000 (M) and recognise years written in Roman numerals. **Autumn 1**	• read, write, (order and compare) numbers up to 10 000 000 and determine the value of each digit **Autumn 1**

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Place Value : Use PV and Compare	• given a number, identify one more and one less **Autumn 1** **Autumn 4** **Spring 2** **Summer 4**	• recognise the place value of each digit in a two-digit number (tens, ones) • compare and order numbers from 0 up to 100; use <, > and = signs **Autumn 1**	• recognise the place value of each digit in a three-digit number (hundreds, tens, ones) • compare and order numbers up to 1000 **Autumn 1**	• find 1000 more or less than a given number • recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones) • order and compare numbers beyond 1000 **Autumn 1**	• (read, write) order and compare numbers to at least 1 000 000 and determine the value of each digit **Autumn 1**	• (read, write), order and compare numbers up to 10 000 000 and determine the value of each digit **Autumn 1**
Place Value: Problems& Rounding		• use place value and number facts to solve problems. **Autumn 1**	• solve number problems and practical problems involving these ideas **Autumn 1**	• round any number to the nearest 10, 100 or 1000 • solve number and practical problems that involve all of the above and with increasingly large positive numbers **Autumn 1**	• interpret negative numbers in context • round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000 • solve number problems and practical problems that involve all of the above **Autumn 1**	• round any whole number to a required degree of accuracy • use negative numbers in context, and calculate intervals across zero • solve number and practical problems that involve all of the above **Autumn 1**

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Addition & Subtraction: Recall, Represent, Use	• read, write and interpret mathematical statements involving addition (+), subtraction (−) and equals (=) signs • represent and use number bonds and related subtraction facts within 20 **Autumn 2** **Spring 1**	• recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 • show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot • recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems **Autumn 2**	• estimate the answer to a calculation and use inverse operations to check answers **Autumn 2**	• estimate and use inverse operations to check answers to a calculation **Autumn 2**	• use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy **Autumn 2**	

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Addition & Subtraction: Calculations	• add and subtract one-digit and two-digit numbers to 20, including zero **Autumn 2** **Spring 1**	• add and subtract numbers using concrete objects, pictorial representations, and mentally, including: ➢ a two-digit number and ones ➢ a two-digit number and tens ➢ two two-digit numbers ➢ adding three one-digit numbers **Autumn 2**	• add and subtract numbers mentally, including: ➢ a three-digit number and ones ➢ a three-digit number and tens ➢ a three-digit number and hundreds • add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction **Autumn 2**	• add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate **Autumn 2**	• add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) • add and subtract numbers mentally with increasingly large numbers **Autumn 2**	• perform mental calculations, including with mixed operations and large numbers • use their knowledge of the order of operations to carry out calculations involving the four operations **Autumn 2**

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Addition & Subtraction: Solve Problems	• solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = □ – 9 **Autumn 2** **Spring 1**	• solve problems with addition and subtraction: ➢ using concrete objects and pictorial representations, including those involving numbers, quantities and measures ➢ applying their increasing knowledge of mental and written methods **Autumn 2**	• solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction **Autumn 2**	• solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why **Autumn 2**	• solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why • solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign **Autumn 2**	• solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why **Autumn 2**

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Multiplication & Division: Recall, Represent, Use		• recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers • show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot **Autumn 4** **Spring 1**	• recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables **Autumn 3**	• recall multiplication and division facts for multiplication tables up to 12 × 12 • use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers • recognise and use factor pairs and commutativity in mental calculations **Autumn 4** **Spring 1**	• identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers • know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers • establish whether a number up to 100 is prime and recall prime numbers up to 19 • recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3}) **Autumn 4**	• identify common factors, common multiples and prime numbers • use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy. **Autumn 2**

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Multiplication & Division: Calculations		• calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs **Autumn 4** **Spring 1**	• write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods **Autumn 3** **Spring 1**	• multiply two-digit and three-digit numbers by a one-digit number using formal written layout **Spring 1**	• multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers • multiply and divide numbers mentally drawing upon known facts • divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context • multiply and divide whole numbers and those involving decimals by 10, 100 and 1000 **Autumn 4** **Spring 1** **Summer 1**	• multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication • divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context • divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context • perform mental calculations, including with mixed operations and large numbers **Autumn 2**

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Multiplication & Division: Solve Problems	• solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher **Summer 1**	• solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts **Autumn 4** **Spring 1**	• solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects **Spring 1**	• solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects **Spring 1**	• solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes • solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates **Autumn 4** **Spring 1**	• solve problems involving addition, subtraction, multiplication and division **Autumn 2**
Multiplication & Division: Combined Operations					• solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign **Spring 1**	• use their knowledge of the order of operations to carry out calculations involving the four operations **Autumn 2**

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Fractions: Recognise and Write	• recognise, find and name a half as one of two equal parts of an object, shape or quantity • recognise, find and name a quarter as one of four equal parts of an object, shape or quantity **Summer 2**	• recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity **Spring 4**	• count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10 • recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators • recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators **Spring 5**	• count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten. **Spring 3**	• identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths • recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number [for example, $\frac{2}{5}+\frac{4}{5}=\frac{6}{5}=1\frac{1}{5}$] **Spring 2**	
Fractions: Compare		• Recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$ **Spring 4**	• recognise and show, using diagrams, equivalent fractions with small denominators • compare and order unit fractions, and fractions with the same denominators **Summer 1**	• recognise and show, using diagrams, families of common equivalent fractions **Spring 3**	• compare and order fractions whose denominators are all multiples of the same number **Spring 2**	• use common factors to simplify fractions; use common multiples to express fractions in the same denomination • compare and order fractions, including fractions > 1 **Autumn 3**

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Fractions: Calculations		• write simple fractions for example, $\frac{1}{2}$ of 6 = 3 **Spring 4**	• add and subtract fractions with the same denominator within one whole [for example, $\frac{5}{7} + \frac{1}{7} = \frac{6}{7}$] **Summer 1**	• add and subtract fractions with the same denominator **Spring 3**	• add and subtract fractions with the same denominator and denominators that are multiples of the same number • multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams **Spring 3**	• add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions • multiply simple pairs of proper fractions, writing the answer in its simplest form [for example, $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$] • divide proper fractions by whole numbers [for example, $\frac{1}{3} \div 2 = \frac{1}{6}$] **Autumn 3**
Fractions: Solve Problems			• solve problems that involve all of the above **Spring 5** **Summer 1**	• solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number **Spring 3**		

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Decimals: Recognise and Write				• recognise and write decimal equivalents of any number of tenths or hundredths • recognise and write decimal equivalents to $\frac{1}{4}, \frac{1}{2}, \frac{3}{4}$ **Spring 4** **Summer 1**	• read and write decimal numbers as fractions [for example, $0.71 = \frac{71}{100}$] • recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents **Spring 3**	• identify the value of each digit in numbers given to three decimal places **Spring 1**
Decimals: Compare				• round decimals with one decimal place to the nearest whole number • compare numbers with the same number of decimal places up to two decimal places **Summer 1**	• round decimals with two decimal places to the nearest whole number and to one decimal place • read, write, order and compare numbers with up to three decimal places **Spring 3**	

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Decimals: Calculations & Problems				• find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths **Spring 4**	• solve problems involving number up to three decimal places **Summer 1**	• multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places • multiply one-digit numbers with up to two decimal places by whole numbers • use written division methods in cases where the answer has up to two decimal places • solve problems which require answers to be rounded to specified degrees of accuracy **Spring 1**

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Fractions, Decimals and Percentages				• solve simple measure and money problems involving fractions and decimals to two decimal places **Spring 3** **Spring 4** **Summer 1**	• recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal • solve problems which require knowing percentage and decimal equivalents of $\frac{1}{2}, \frac{1}{4}, \frac{1}{5}, \frac{2}{5}, \frac{4}{5}$ and those fractions with a denominator of a multiple of 10 or 25 **Spring 3**	• associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, $\frac{3}{8}$] • recall and use equivalences between simple fractions, decimals and percentages, including in different contexts **Spring 1** **Spring 2**

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Ratio and Proportion						• solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts • solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison • solve problems involving similar shapes where the scale factor is known or can be found • solve problems involving unequal sharing and grouping using knowledge of fractions and multiples. **Spring 6**

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Algebra	• solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = □ – 9	• recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems	• solve problems, including missing number problems			• use simple formulae • generate and describe linear number sequences • express missing number problems algebraically • find pairs of numbers that satisfy an equation with two unknowns • enumerate possibilities of combinations of two variables. **Spring 3**

Note – although algebraic notation is not introduced until Y6, algebraic thinking starts much earlier as exemplified by the 'missing number' objectives from Y1/2/3

Measurement: Using Measures

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
• compare, describe and solve practical problems for: ➢ lengths and heights [for example, long/short, longer/shorter, tall/short, double/half] ➢ mass/weight [for example, heavy/light, heavier than, lighter than] ➢ capacity and volume [for example, full/empty, more than, less than, half, half full, quarter] ➢ time [for example, quicker, slower, earlier, later] • measure and begin to record the following: ➢ lengths and heights ➢ mass/weight ➢ capacity and volume ➢ time (hours, minutes, seconds)	• choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature (°C); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels • compare and order lengths, mass, volume/capacity and record the results using >, < and =	• measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml)	• Convert between different units of measure [for example, kilometre to metre; hour to minute] • estimate, compare and calculate different measures	• convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre) • understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints • use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling	• solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate • use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places • convert between miles and kilometres
Spring 3 **Spring 4** **Summer 6**	**Spring 5** **Summer 4**	**Spring 4** **Summer 4**	**Autumn 3** **Spring 2** **Summer 3**	**Summer 1** **Summer 4** **Summer 5**	**Spring 4**

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Measurement: Money	• recognise and know the value of different denominations of coins and notes **Summer 5**	• recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value • find different combinations of coins that equal the same amounts of money • solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change **Autumn 3**	• add and subtract amounts of money to give change, using both £ and p in practical contexts **Spring 2**	• estimate, compare and calculate different measures, including money in pounds and pence **Summer 2**	• use all four operations to solve problems involving measure [for example, money] **Summer 1**	

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Measurement: Time	• sequence events in chronological order using language [for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening] • recognise and use language relating to dates, including days of the week, weeks, months and years • tell the time to the hour and half past the hour and draw the hands on a clock face to show these times **Summer 6**	• compare and sequence intervals of time • tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times • know the number of minutes in an hour and the number of hours in a day **Summer 3**	• tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks • estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight • know the number of seconds in a minute and the number of days in each month, year and leap year • compare durations of events [for example to calculate the time taken by particular events or tasks] **Summer 2**	• read, write and convert time between analogue and digital 12- and 24-hour clocks • solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days **Summer 3**	• solve problems involving converting between units of time **Summer 4**	• use, read, write and convert between standard units, converting measurements of time from a smaller unit of measure to a larger unit, and vice versa **Year 5 Summer 4**

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Measurement: Perimeter, Area, Volume			• measure the perimeter of simple 2-D shapes **Spring 4**	• measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres • find the area of rectilinear shapes by counting squares **Autumn 3** **Spring 2**	• measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres • calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm^2) and square metres (m^2) and estimate the area of irregular shapes • estimate volume [for example, using 1 cm^3 blocks to build cuboids (including cubes)] and capacity [for example, using water] **Autumn 5** **Summer 5**	• recognise that shapes with the same areas can have different perimeters and vice versa • recognise when it is possible to use formulae for area and volume of shapes • calculate the area of parallelograms and triangles • calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm^3) and cubic metres (m^3), and extending to other units [for example, mm^3 and km^3] **Spring 5**

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Geometry: 2-D Shapes	• recognise and name common 2-D shapes [for example, rectangles (including squares), circles and triangles] **Autumn 3**	• identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line • identify 2-D shapes on the surface of 3-D shapes, [for example, a circle on a cylinder and a triangle on a pyramid] • compare and sort common 2-D shapes and everyday objects **Spring 3**	• draw 2-D shapes **Summer 3**	• compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes • identify lines of symmetry in 2-D shapes presented in different orientations **Summer 5**	• distinguish between regular and irregular polygons based on reasoning about equal sides and angles. • use the properties of rectangles to deduce related facts and find missing lengths and angles **Summer 2**	• draw 2-D shapes using given dimensions and angles • compare and classify geometric shapes based on their properties and sizes • illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius **Summer 1**
Geometry: 3-D Shapes	• recognise and name common 3-D shapes [for example, cuboids (including cubes), pyramids and spheres] **Autumn 3**	• recognise and name common 3-D shapes [for example, cuboids (including cubes), pyramids and spheres]. • compare and sort common 3-D shapes and everyday objects **Spring 3**	• make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them **Summer 3**		• identify 3-D shapes, including cubes and other cuboids, from 2-D representations **Summer 2**	• recognise, describe and build simple 3-D shapes, including making nets **Summer 1**

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Geometry: Angles & Lines			• recognise angles as a property of shape or a description of a turn • identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle • identify horizontal and vertical lines and pairs of perpendicular and parallel lines **Summer 3**	• identify acute and obtuse angles and compare and order angles up to two right angles by size • identify lines of symmetry in 2-D shapes presented in different orientations • complete a simple symmetric figure with respect to a specific line of symmetry **Summer 5**	• know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles • draw given angles, and measure them in degrees • identify: ➢ angles at a point and one whole turn (total 360°) ➢ angles at a point on a straight line and $\frac{1}{2}$ a turn (total 180°) ➢ other multiples of 90° **Summer 2**	• find unknown angles in any triangles, quadrilaterals, and regular polygons • recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles **Summer 1**

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Geometry: Position & Direction	• describe position, direction and movement, including whole, half, quarter and three-quarter turns **Summer 3**	• order and arrange combinations of mathematical objects in patterns and sequences • use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise) **Spring 3** **Summer 1**		• describe positions on a 2-D grid as coordinates in the first quadrant • describe movements between positions as translations of a given unit to the left/right and up/down • plot specified points and draw sides to complete a given polygon **Summer 6**	• identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed **Summer 3**	• describe positions on the full coordinate grid (all four quadrants) • draw and translate simple shapes on the coordinate plane, and reflect them in the axes **Autumn 4**

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Statistics: Present and Interpret		• interpret and construct simple pictograms, tally charts, block diagrams and simple tables **Spring 2**	• interpret and present data using bar charts, pictograms and tables **Spring 3**	• interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs **Summer 4**	• complete, read and interpret information in tables, including timetables **Autumn 3**	• interpret and construct pie charts and line graphs and use these to solve problems **Summer 3**
Statistics: Solve Problems		• ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity • ask and answer questions about totalling and comparing categorical data **Spring 2**	• solve one-step and two-step questions [for example, 'How many more?' and 'How many fewer?'] using information presented in scaled bar charts and pictograms and tables **Spring 3**	• solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs **Summer 4**	• solve comparison, sum and difference problems using information presented in a line graph **Autumn 3**	• calculate and interpret the mean as an average **Summer 3**