Hazlewood
Community Primary School

LIMITLESS POTENTIAL **IGNITE PASSION** **EMBRACE DIFFERENCE**

CALCULATION POLICY 2022-2023

Subject Leader: Mrs L Patterson

This calculation policy has been developed and agreed after using the National Curriculum objectives and methods in conjunction to the Maths Hub schemesof learning. This calculation policy sets out the methods that children will be taught and encouraged to use when tackling calculations as part of their daily Maths lessons and during their work in a wide range of cross-curricular and real-life contexts. The policy reflects our belief that the methods taught should make sense to children and should be both efficient and reliable.

The national curriculum for mathematics aims to ensure that all pupils:

- become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, sothat pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification orproof using mathematical language
- can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breakingdown problems into a series of simpler steps and persevering in seeking solutions.

What makes a
mathematician?
A definition of a
Mathematician:

- Someone who can see patterns;
- Someone who shows deeper application;
- Someone who identifies and understands the interconnectivity of concepts and demonstrates this through the transfer of skills;
- Someone who is systematic and resilient and can extend their own learning.

At Towngate Primary Academy, we believe that in order to develop confident, competent and resilient young mathematicians, our pupils benefit from followinga mathematical journey to further explore and discover mathematical concepts. To ensure consistency across school, our pupils' learning is deepened by following a clear sequence of learning opportunities:

fluency → reasoning → problem solving

Fluency

One of the three aims of the National Curriculum states that pupils (of all ages, not just primary children) will:

"*become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.*"

Fluency is more than simply practicing a calculation or following a procedure; fluency relies on demonstrating an efficient approach to mathematics; choosingto use efficient strategy that can be carried out easily and quickly. Fluency demands accuracy and sound understanding of key number facts, concepts andrelationships whilst relying on flexibility to understand that maths can be presented in a number of different ways. Fluency demands more of pupils than simply memorising a single procedure – they need to understand *why* they are doing what they are doing and *know when it is appropriate* to use different methods.

A key element of fluency is procedural variation: to be confident mathematicians, pupils need to see maths in a variety of different ways – using key conceptsto apply what they already know to new learning.

Reasoning

The second aim of the National Curriculum indicates that pupils will:

"*reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language.*"

Effective reasoning relies on using and applying prior knowledge to a given context or problem. Reasoning requires logical thinking to tackle a challenging concept– allowing time to try different strategies to reach a given outcome. In practice, through reasoning focused lessons, pupils develop their ability to select appropriatestrategies to solve a problem, to draw logical conclusions, to develop and explain solutions / methods and to reflect on their own mathematic challenges andsuccesses. In order for our pupils to reason accurately, we use a range of different question stems to promote discussion and discovery. Some of these include:spot the mistake, find the odd one out, what's the same – what's different, convince me etc. When learners are able to explain and justify their learning andmathematical choices, these skills can be transferred into isolated problem solving investigations and opportunities.

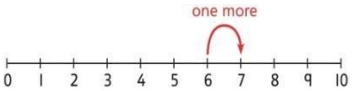
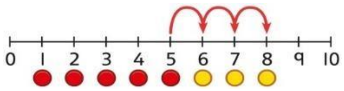
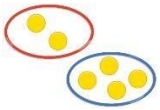
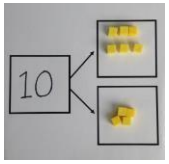
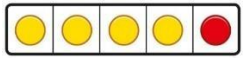
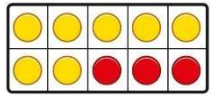
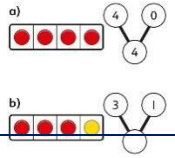
Problem Solving

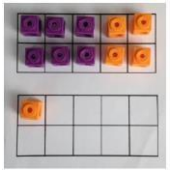
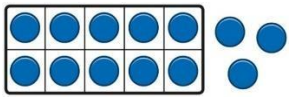
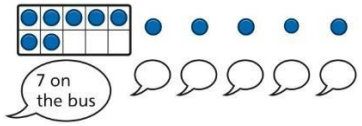
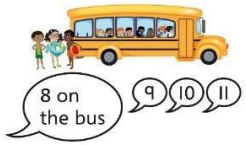
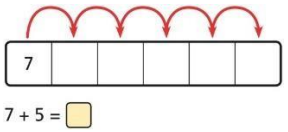
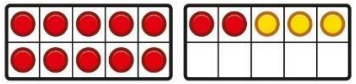
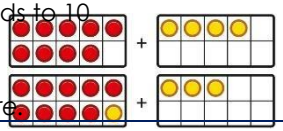
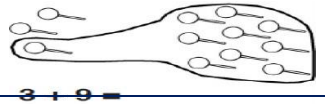
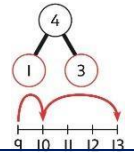
The third aim of the National Curriculum programme of study for mathematics explains that pupils can:

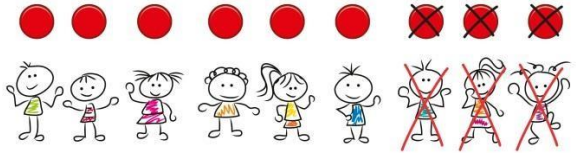
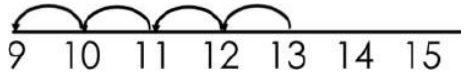
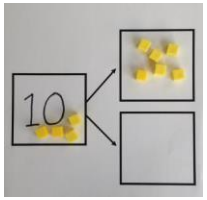
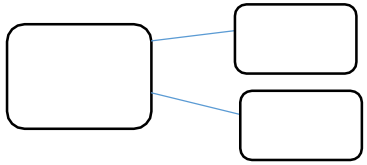
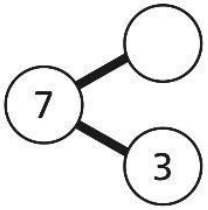
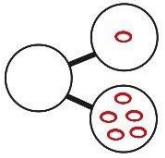
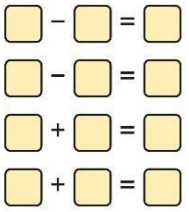
"*can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.*"

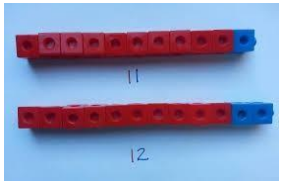
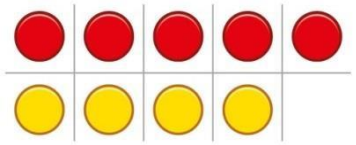
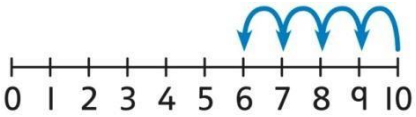
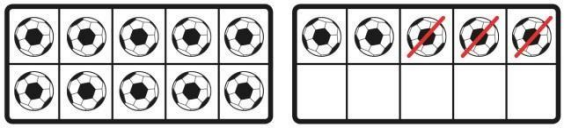
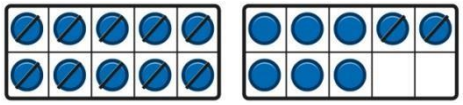
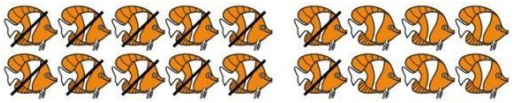
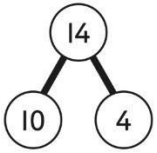
Problem solving allows opportunities for pupils to apply their understanding to isolated concepts. Through effective problem solving, pupils are able to makesense of mathematics through exploring 'real world' contextual problems; by applying knowledge of a given skill, pupils are able to gain a better understandingof the modern world around them. Problem solving allows for pupils to seek solutions, explore patterns, formulate conjectures. Through problem solving, pupils learn to take risks in their learning, to persevere in a task and experience success.

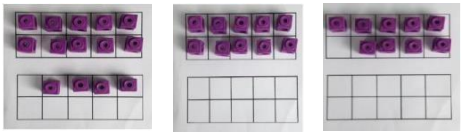
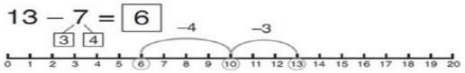
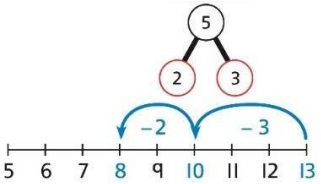
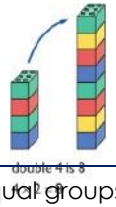
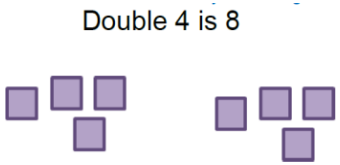
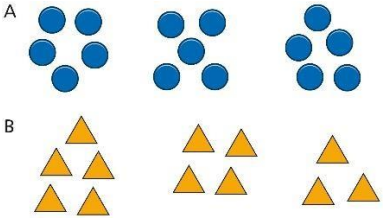
KEY STAGE 1		
Children develop the core ideas that underpin all calculation. They begin by connecting calculation with counting on and counting back, but they should learn that understanding wholes and parts will enable them to calculate efficiently and accurately, and with greater flexibility. They learn how to use an understanding of 10s and 1s to develop their calculation strategies, especially in addition and subtraction.		
Addition and subtraction: Children first learn to connect addition and subtraction with counting, but they soon develop two very important skills: an understanding of partsand wholes, and an understanding of unitising 10s, to develop efficient and effective calculation strategies based onknown number bonds and an increasing awareness of placevalue. Addition and subtraction are taught in a way that is interlinked to highlight the link between the two operations. A key idea is that children will select methods and approaches based on their number sense. For example, in Year 1, when faced with 15 − 3 and 15 − 13, they will adapt their ways of approaching the calculation appropriately. Theteaching should always emphasise the importance of mathematical thinking to ensure accuracy and flexibility ofapproach, and the importance of using known number factsto harness their recall of bonds within 20 to support both addition and subtraction methods. In Year 2, they will start to see calculations presented in a column format, although this is not expected to be formaliseduntil KS2. We show the column method in Year 2 as an option; teachers may not wish to include it until Year 3.	Multiplication and division: Children develop an awareness ofequal groups and link this with counting in equal steps, starting with 2s, 5s and 10s. In Year 2, they learn to connect the language of equal groups with the mathematical symbolsfor multiplication and division. They learn how multiplication and division can be related torepeated addition and repeated subtraction to find the answerto the calculation. In this key stage, it is vital that children explore and experience a variety of strong images and manipulative representations of equal groups, including concrete experiences as well as abstract calculations. Children begin to recall some key multiplication facts, including doubles, and an understanding of the 2, 5 and 10times-tables and how they are related to counting.	Fractions: In Year 1, children encounter halves and quarters, and link this with their understanding of sharing. They experience key spatial representations of these fractions, and learn to recognise examples and non-examples, based on theirawareness of equal parts of a whole. In Year 2, they develop an awareness of unit fractions andexperience non-unit fractions, and they learn to write themand read them in the common format of numerator and denominator.

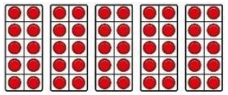
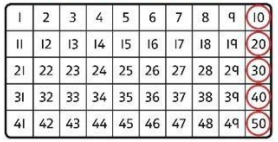
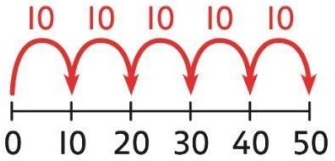
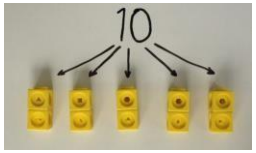
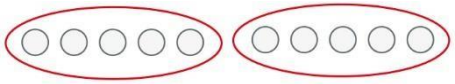
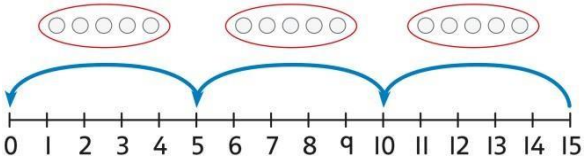
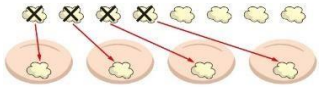
Year 1			
	Concrete	Pictorial	Abstract
Year 1 Addition	Counting and adding more Children add one more person or object to a group tofind one more. 	Counting and adding more Children add one more cube or counter to a group torepresent one more.   *One more than 4 is 5.*	Counting and adding more Use a number line to understand how to link countingon with finding one more.  *One more than 6 is 7.* *7 is one more than 6.* Learn to link counting on with adding more than one.  *5 + 3 = 8*
	Understanding part-part-whole relationship (partitioning) Sort people and objects into parts and understand therelationship with the whole.  *The parts are 2 and 4.The whole is 6.*	Understanding part-part-whole relationship (partitioning) Children draw to represent the parts and understandthe relationship with the whole.  *The parts are 1 and 5. The whole is 6.*	Understanding part-part-whole relationship (partitioning) Use a part-whole model to represent the numbers.   *6 + 4 = 10*
	Knowing and finding number bonds within 10(commutativity) Break apart a group and put back together to find andform number bonds. *6 + 4 = 10*  *6 = 2 + 4* 	Knowing and finding number bonds within 10(commutativity) Use five and ten frames to represent key numberbonds.  *5 = 4 + 1*  *10 = 7 + 3*	Knowing and finding number bonds within 10(commutativity) Use a part-whole model alongside other representations to find number bonds. Make sure toinclude examples where one of the parts is zero. *4 + 0 = 4* *3 + 1 = 4* 

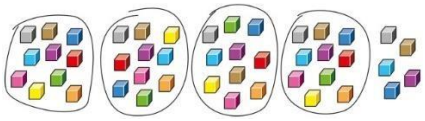
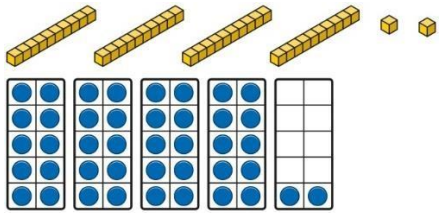
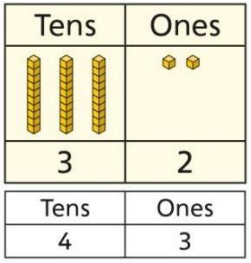
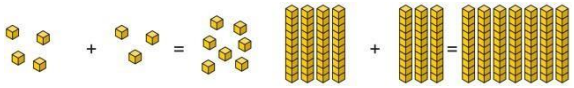
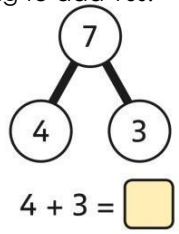
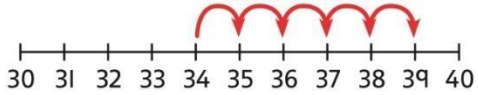
	Understanding teen numbers as a complete 10 andsome more Complete a group of 10 objects and count more. *11 is 10 and 1 more.* 	Understanding teen numbers as a complete 10 andsome more Use a ten frame to support understanding of acomplete 10 for teen numbers.  *13 is 10 and 3 more.*	Understanding teen numbers as a complete 10 andsome more. *1 ten and 3 ones equal 13.* *10 + 3 = 13*
	Adding by counting on (augmentation) Children use counters to support and represent theircounting on strategy. 	Adding by counting on (augmentation) Children use knowledge of counting to 20 to find atotal by counting on using people or objects. 	Adding by counting on (augmentation) Children use number lines or number tracks to supporttheir counting on strategy. 
	Adding the 1s Children use concrete materials to recognise how toadd the 1s to find the total efficiently.  *2 + 3 = 5* *12 + 3 = 15*	Adding the 1s Children represent calculations using ten frames toadd a teen and 1s.  *2 + 3 = 5* *12 + 3 = 15*	Adding the 1s Children recognise that a teen is made from a 10 and some 1s and use their knowledge of addition within 10to work efficiently. *3 + 5 = 8* *So, 13 + 5 = 18*
	Bridging the 10 using number bonds Children use counters to complete a ten frame and understand how they can add using knowledge ofnumber bonds to 10.  *9 add 1 makes 10.* *So, 9 add 4 is 10 and 3 more.*	Bridging the 10 using number bonds Use pictures or a number line. Regroup or partition thesmaller number to make 10. .  .	Bridging the 10 using number bonds Use a part-whole model and a number line to supportthe calculation.  *9 + 4 = 13*

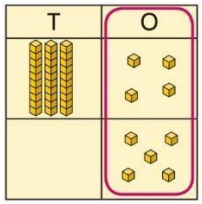
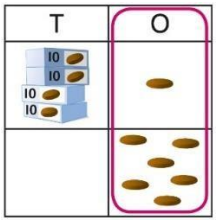
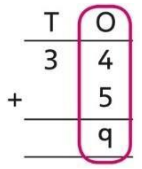
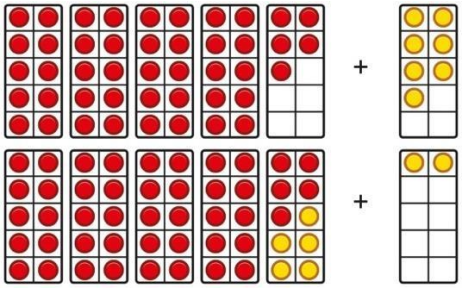
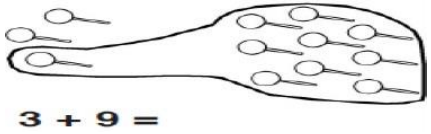
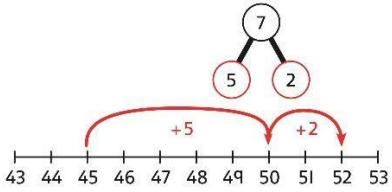
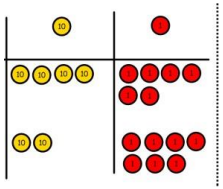
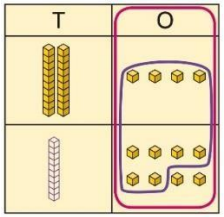
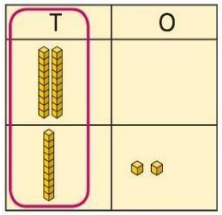
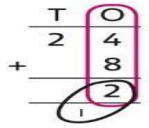
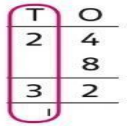
Year 1 Subtraction	Counting back and taking away (reduction) Children arrange objects and remove to find howmany are left.  *1 less than 6 is 5.* *6 subtract 1 is 5.*	Counting back and taking away (reduction) Children draw and cross out or use counters torepresent objects from a problem. 	Counting back and taking away (reduction) Children count back to take away and use a numberline or number track to support the method.  *9 – 3 = 6*
	Finding a missing part, given a whole and a part(partitioning) Children separate a whole into parts and understandhow one part can be found by subtraction.  *10 – 6 = ?*	Finding a missing part, given a whole and a part(partitioning) Children represent a whole and a part and understandhow to find the missing part by subtraction. 	Finding a missing part, given a whole and a part(partitioning) Children use a part-whole model to support thesubtraction to find a missing part.  *7 – 3 = ?* Children develop an understanding of the relationshipbetween addition and subtraction facts in a part- whole model.  

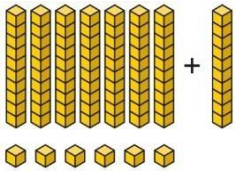
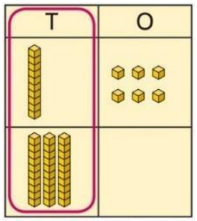
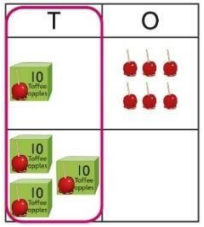
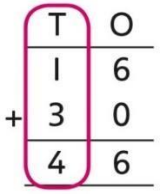
	Finding the difference Arrange two groups so that the difference between thegroups can be worked out.  *12 is 1 more than 11.* *11 is 1 less than 12.* *The difference between 11and 12 is 1.*	Finding the difference Represent objects using sketches or counters tosupport finding the difference.  *5 − 4 = 1* *The difference between 5 and 4 is 1.*	Finding the difference Children understand 'find the difference' as subtraction.  *10 − 4 = 6* *The difference between 10 and 6 is 4.*
	Subtraction within 20 Understand when and how to subtract 1s efficiently.Use a bead string to subtract 1s efficiently.  *5 − 3 = 2* *15 − 3 = 12*	Subtraction within 20 Understand when and how to subtract 1s efficiently.  *5 − 3 = 2* *15 − 3 = 12*	Subtraction within 20 Understand how to use knowledge of bonds within 10to subtract efficiently. *5 − 3 = 2* *15 − 3 = 12*
	Subtracting 10s and 1s For example: 18 − 12 Subtract 12 by first subtracting the 10, then theremaining 2.  *First subtract the 10, then take away 2.*	Subtracting 10s and 1s For example: 18 − 12  *First subtract the 10, then subtract 2.*	Subtracting 10s and 1s Use a part-whole model to support the calculation.  *19 − 14* *19 − 10 = 9* *9 − 4 = 5* *So, 19 − 14 = 5*

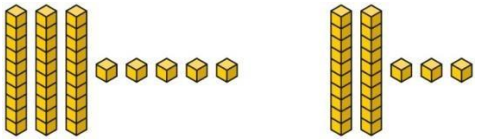
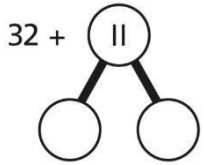
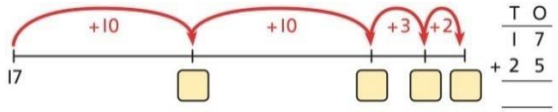
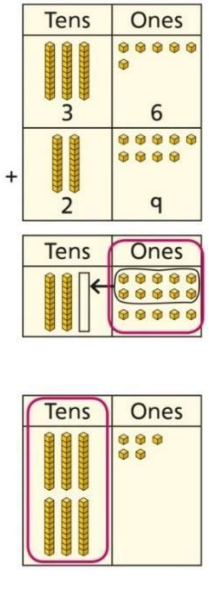
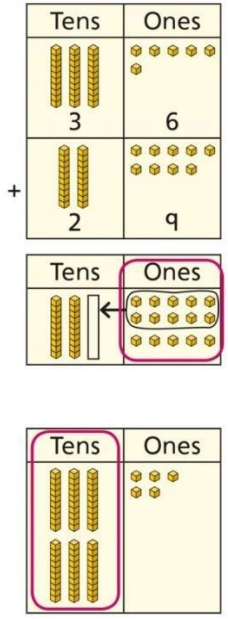
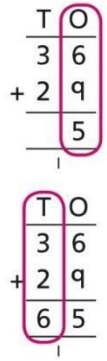
	Subtraction bridging 10 using number bondsFor example: 14 − 9 Arrange objects into a 10 and some 1s, then decide onhow to split the 9 into parts.  *9 is 4 and 5, so I take away the 4 and then the 5.*	Subtraction bridging 10 using number bondsRepresent the use of bonds using ten frames.  *For 13 – 7, I take away 3 to make 10, then take away4 to make 6.*	Subtraction bridging 10 using number bonds Use a number line and a part-whole model to supportthe method. *13 − 5* 
Year 1 Multiplication	Doubling Use practical activities to show how to double anumber.  	Doubling Draw pictures to show how to double a number  	Double Use known number facts to mentally double numberswithin 10. *Double 4 = 8*
	Recognising and making equal groups Children arrange concrete objects in equal and unequal groups and understand how to recognisewhether they are equal.  	Recognising and making equal groups Children draw and represent equal and unequalgroups.  	Describe equal groups using words *Three equal groups of 4.Four equal groups of 3.*
	Finding the total of equal groups by counting in 2s,5s and 10s	Finding the total of equal groups by counting in 2s,5s and 10s	Finding the total of equal groups by counting in 2s, 5sand 10s

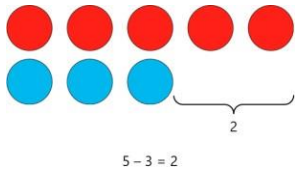
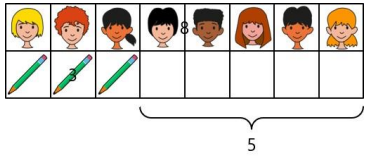
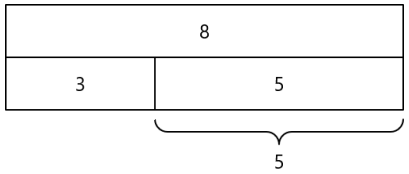
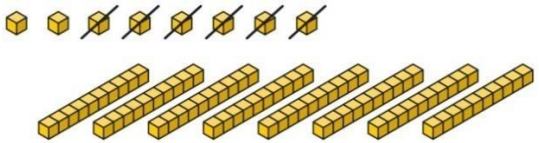
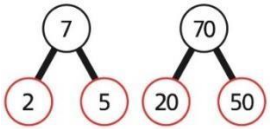
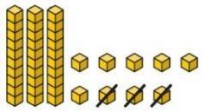
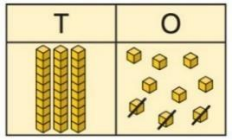
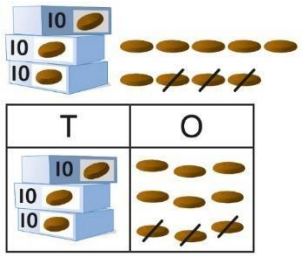
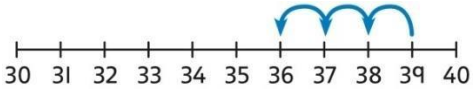
	 There are 5 pens in each pack … 5…10…15…20…25…30…35…40… 	100 squares and ten frames support counting in 2s, 5sand 10s.   	Use a number line to support repeated addition through counting in 2s, 5s and 10s. 
Year 1 Division	Grouping Learn to make equal groups from a whole and findhow many equal groups of a certain size can be made. Sort a whole set people and objects into equal groups.   *There are 10 childrenaltogether. There are 2 in each group.There are 5 groups.*	Grouping Represent a whole and work out how many equalgroups.  *There are 10 in total. There are 5 in each group.There are 2 groups.*	Grouping Children may relate this to counting back in steps of 2,5 or 10. 
	Sharing Share a set of objects into equal parts and work outhow many are in each part.  	Sharing Sketch or draw to represent sharing into equal parts. This may be related to fractions.  8 ÷ 2 = 4	Sharing *10 shared into 2 equal groups gives 5 in each group.* 10 ÷ 2 = 5

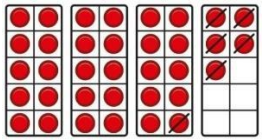
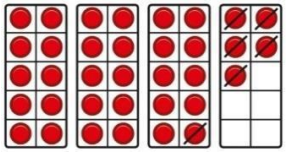
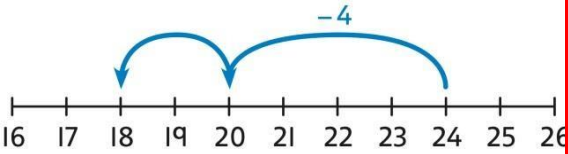
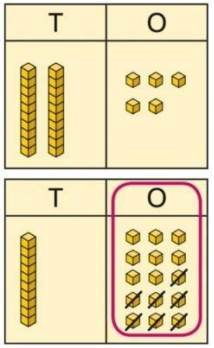
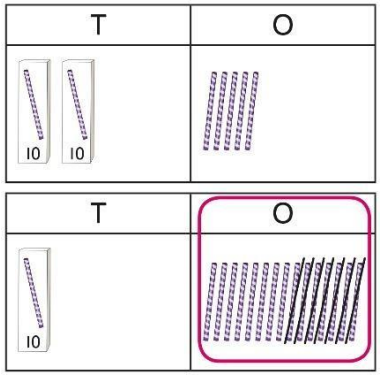
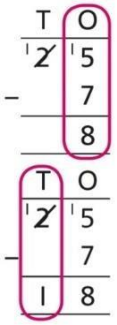
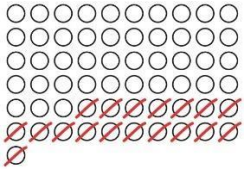
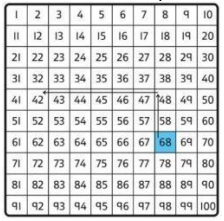
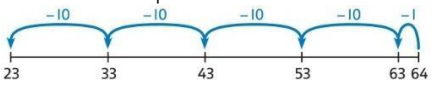
Year 2			
	Concrete	Pictorial	Abstract
Year 2 Addition			
Understanding 10sand 1s	Group objects into 10s and 1s.  Bundle straws to understand unitising of 10s. 	Understand 10s and 1s equipment, and link withvisual representations on ten frames. 	Represent numbers on a place value grid, usingequipment or numerals. 
Adding 10s	Use known bonds and unitising to add 10s.  *I know that 4 + 3 = 7.* *So, I know that 4 tens add 3 tens is 7 tens.*	Use known bonds and unitising to add 10s.  *I know that 4 + 3 = 7.* *So, I know that 4 tens add 3 tens is 7 tens.*	Use known bonds and unitising to add 10s. *4 + 3 = 7* *4 tens + 3 tens = 7 tens* *40 + 30 = 70* 
Adding a 1-digit number to a 2-digit number notbridging a 10	Aggregation and Augmentation Add the 1s to find the total. Use known bonds within10.  *34 is 3 tens and 4 additional ones.* *34 add 5 ones is 3 tens and 9 additional ones.*	Aggregation and AugmentationAdd the 1s.  *41 is 4 tens and 1 additional ones.* *1 ones and 6 ones are 7 ones.* *The total is 3 tens and 7 additional ones.*	Aggregation and AugmentationAdd the 1s. Understand the link between counting on and using known number facts. Children should be encouragedto use known number bonds to improve efficiency andaccuracy. 

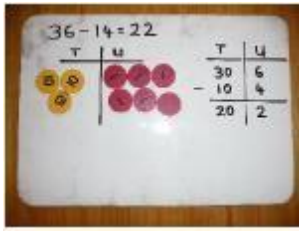
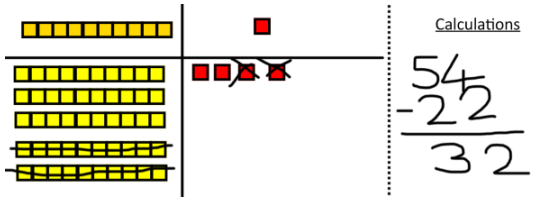
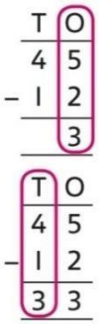
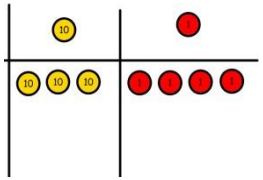
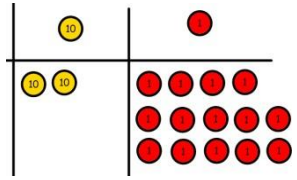
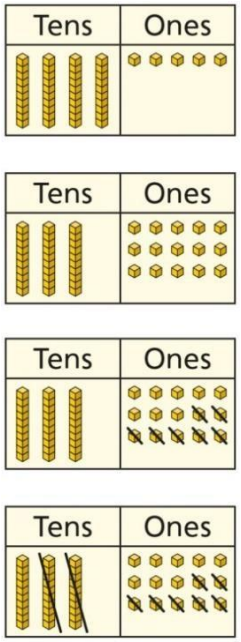
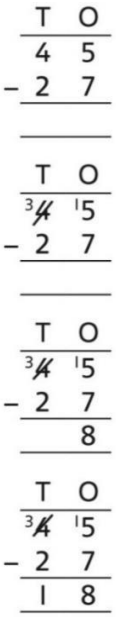
	This can also be done in a place value grid.  	 	This can be represented horizontally or vertically. *34 + 5 = 39* *or* 
Adding a 1-digit number to a2-digit number bridging 10	Making 10 Complete a 10 using number bonds.  *There are 4 tens and 5 additional ones.* *I need to add 7. I will use 5 to complete a 10, thenadd 2 more ones.*	Making 10 Complete a 10 using number bonds.  	Making 10 Complete a 10 using number bonds.  *7 = 5 + 2* *45 + 5 + 2 = 52*
Adding a 1-digit number to a2-digit number using exchange	Making 10 Exchange 10 ones for 1 ten. 	Making 10 Exchange 10 ones for 1 ten.   	Making 10 Exchange 10 ones for 1 ten.  

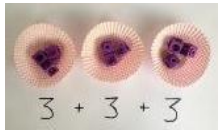
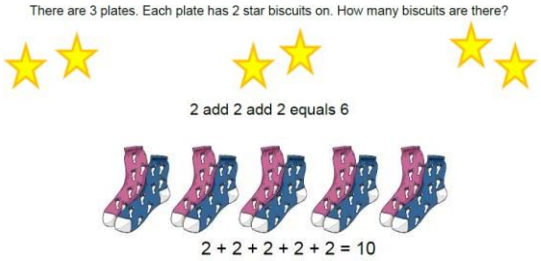
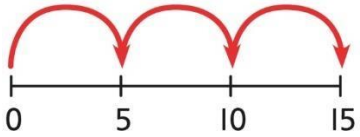
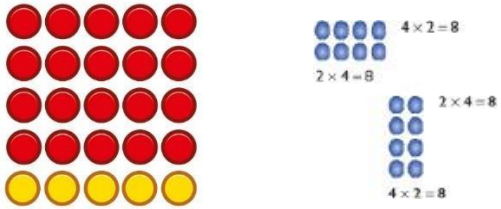
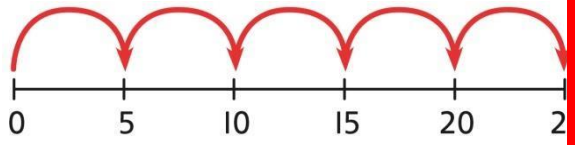
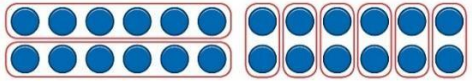
Adding a multipleof 10 to a 2-digit number	Partitioning Add the 10s and then recombine.  *66 is 6 tens and 6 additional ones.* *66 + 10 = 76*	Partitioning Add the 10s and then recombine. A 100 square can support this understanding.   *27 is 2 tens and 7 additional ones.* *50 is 5 tens.* *There are 7 tens in total and 7 additional ones.So, 27 + 50 is 7 tens and 7 additional ones.*	Partitioning Add the 10s and then recombine. *37 + 20 = ?* *30 + 20 = 50* *50 + 7 = 57* *37 + 20 = 57*
Adding a multipleof 10 to a 2-digit number using columns	Add the 10s using a place value grid to support.  *16 is 1 ten and 6additional ones.30 is 3 tens.* *There are 4 tens and 6 additional ones in total.*	Add the 10s using a place value grid to support.  *16 is 1 ten and 6 additional ones.* *30 is 3 tens.* *There are 4 tens and 6 additional ones in total.*	Add the 10s represented vertically. Children must understand how the method relates to unitising of 10sand place value.  *1 + 3 = 4* *1 ten + 3 tens = 4 tens* *16 + 30 = 46*
Adding two 2-digit numbers	Partitioning Add the 10s and 1s separately.	Partitioning Add the 10s and 1s separately. Use apart-whole model to support.	Partitioning Add the 10s and the 1s separately, bridging 10s whererequired. A number line can support the calculations.

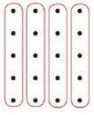
	 *5 + 3 = 8* *There are 8 ones in total.* *3 + 2 = 5* *There are 5 tens in total.* *35 + 23 = 58*	 *11 = 10 + 1* *32 + 10 = 42* *42 + 1 = 43* *32 + 11 = 43*	 *17 + 25*
Adding two 2-digit numberswith exchange	Add the 1s. Emphasis here on children physically exchange 10 ones for a ten. 'One ten is equal to 10 ones' Then add the 10s. 	Add the 1s. Exchange 10 ones for a ten. Then add the10s. 	Add the 1s. Exchange 10 ones for a ten. Then add the10s. 

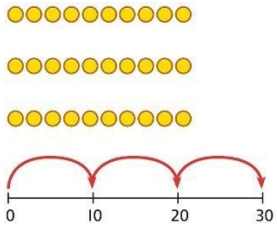
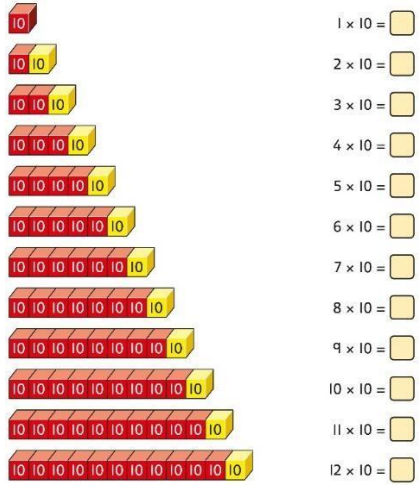
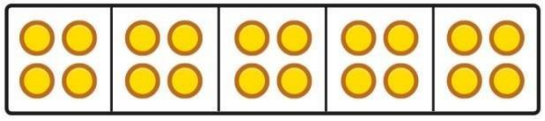
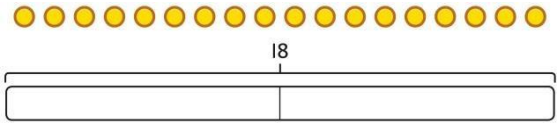
Year 2 Subtraction			
Subtraction asfinding the difference	Compare the set of objects in each group  	Compare the set of objects in each group  	Compare the set of objects in each group 
Subtracting multiples of 10	Use known number bonds and unitising to subtractmultiples of 10.  *8 subtract 6 is 2.* *So, 8 tens subtract 6 tens is 2 tens.*	Use known number bonds and unitising to subtractmultiples of 10.  *10 – 3 = 7* *So, 10 tens subtract 3 tens is 7 tens.*  	Use known number bonds and unitising to subtractmultiples of 10. *7 tens subtract 5 tens is 2 tens.* *70 – 50 = 20*
Subtracting a single-digit number	Subtract the 1s. This may be done in or out of a placevalue grid.   	Subtract the 1s. This may be done in or out of a placevalue grid.  	Subtract the 1s. Understand the link between countingback and subtracting the 1s using known bonds.  T O 3 9 – 3 3 6 9 – 3 = 6 39 – 3 = 36

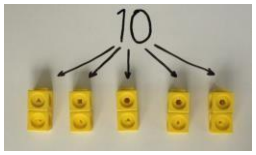
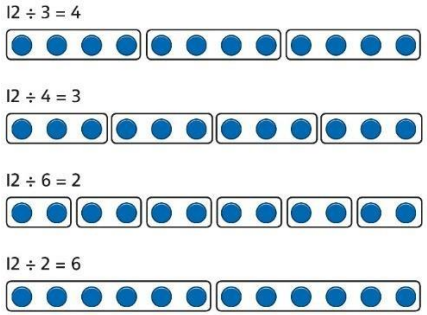
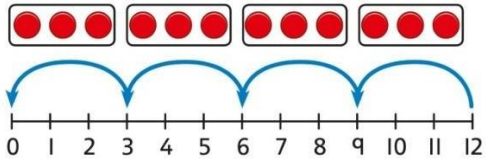
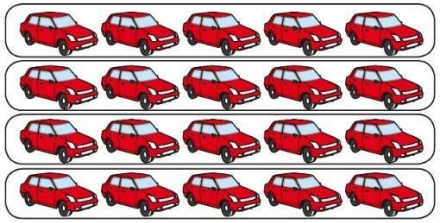
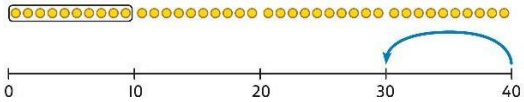
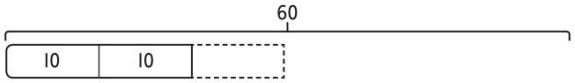
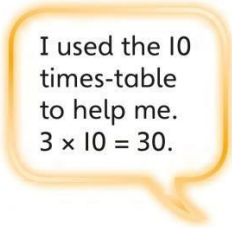
Subtracting a single-digit numberbridging 10	Bridge 10 by using known bonds.  *35 – 6* *6 is made of 5 ones plus 1 one.* *I took away 5 counters, then 1 more.*	Bridge 10 by using known bonds. Drawing representations and crossing out to subtract.  *35 – 6* *First, I will subtract 5, then 1.*	Bridge 10 by using known bonds.  *24 – 6 = ?* *24 – 4 – 2 = ?*
Subtracting a single-digit numberusing exchange	Exchange 1 ten for 10 ones. . Emphasis here on children physically exchange 10 ones for a ten. 'Oneten is equal to 10 ones' This may be done in or out of a place value grid. 	Exchange 1 ten for 10 ones. 	Exchange 1 ten for 10 ones.  *25 – 7 = 18*
Subtracting a 2-digit number	Subtract by taking away.  *61 – 18* *I took away 8 ones and 1 ten.*	Subtract the 1s and the 10s. This can be represented on a 100 square. 	Subtract the 1s and the 10s. This can be represented on a number line.  *64 – 41 = ?* *64 – 1 = 63* *63 – 40 = 23* *64 – 41 = 23*

Subtracting a 2-digit number using place valueand columns	Subtract the 1s. Then subtract the 10s. This may bedone in or out of a place value grid. 	Subtract the 1s. Then subtract the 10s. 	Using column subtraction, subtract the 1s. Thensubtract the 10s. 
Subtracting a 2-digit number withexchange	Exchange 1 ten for 10 ones. Then subtract the 1s. Thensubtract the 10s. 34- 18 =  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 and my tens.	Exchange 1 ten for 10 ones. Then subtract the 1s. Thensubtract the 10s. Show children how the concrete method links to thewritten method alongside your working. Cross out thenumbers when exchanging and show where we write our new amount. 	Using column subtraction, exchange 1 ten for 10 ones.Then subtract the 1s. Then subtract the 10s. 

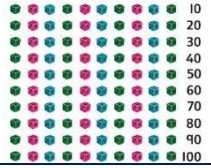
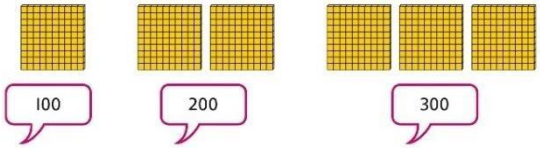
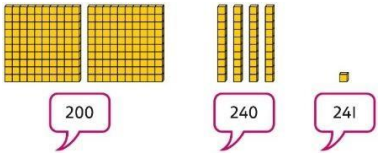
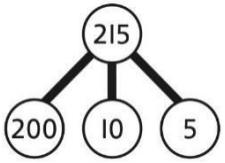
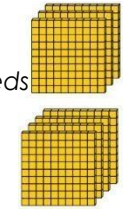
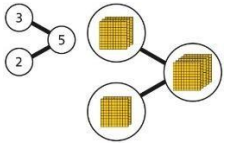
Year 2 Multiplication			
Equal groups andrepeated addition	Recognise equal groups and write as repeated addition and as multiplication.   *3 groups of 3 sweets* *9 sweets altogether*	Recognise equal groups using standard objects andwrite as repeated addition and multiplication. 	Use a number line and write as repeated addition andas multiplication.  *5 + 5 + 5 = 15* *3 × 5 = 15*
Using arrays to represent multiplication andsupport understanding	Understand the relationship between arrays, multiplication and repeated addition. *4 groups of 6*	Understand the relationship between arrays, multiplication and repeated addition. Draw arrays in different rotations to find commutativemultiplication sentences.  *4 groups of 5 … 5 groups of 5*	Understand the relationship between arrays, multiplication and repeated addition.  *5 × 5 = 25*
Understandin g commutativit y	Use arrays to visualise commutativity. *I can see 6 groups of 3.I can see 3 groups of 6.*	Form arrays using counters to visualise commutativity. Rotate the array to show thatorientation does not change the multiplication.  *This is 2 groups of 6 and also 6 groups of 2.*	Use arrays to visualise commutativity. *4 + 4 + 4 + 4 + 4 = 20* *5 + 5 + 5 + 5 = 20* *4 × 5 = 20 and 5 × 4 = 20*

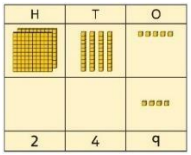
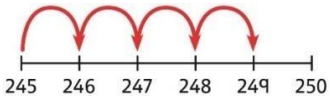
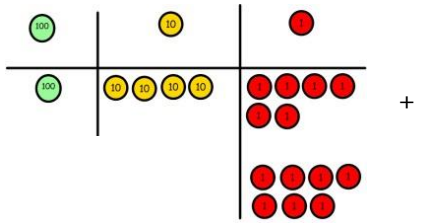
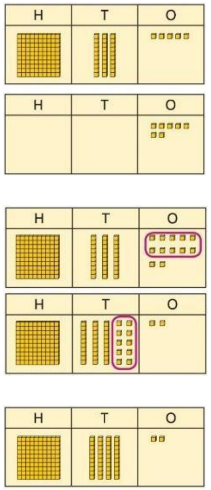
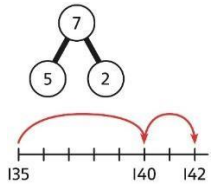


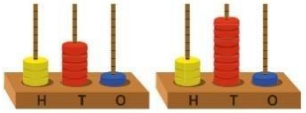
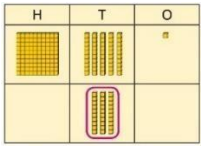
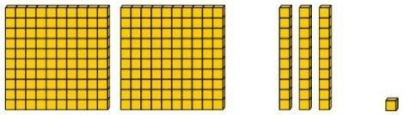
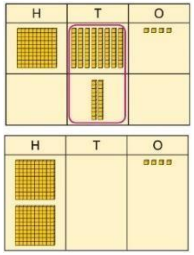
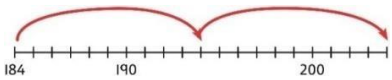
Learning ×2, ×5 and ×10 table facts	Develop an understanding of how to unitise groups of2, 5 and 10 and learn corresponding times-table facts. *3 groups of 10 … 10, 20, 30* *3 × 10 = 30* 	Understand how to relate counting in unitised groupsand repeated addition with knowing key times-tablefacts.  *10 + 10 + 10 = 30* *3 × 10 = 30*	Understand how the times-tables increase and containpatterns.  *5 × 10 = 50* *6 × 10 = 60*
Year 2 Division			
Sharing equally	Start with a whole and share into equal parts, one ata time.   *10 shared equally between 2.They get 5 each.*	Represent the objects shared into equal parts using abar model.  *20 shared into 5 equal parts.There are 4 in each part.*	Use a bar model to support understanding of thedivision.  *18 ÷ 2 = 9*

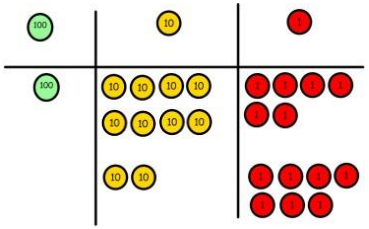
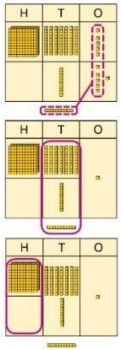
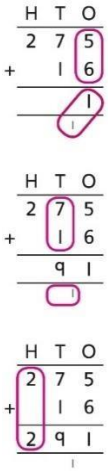
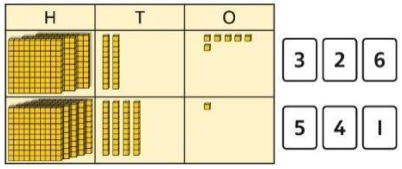
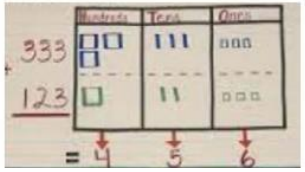
Grouping equally	Understand how to make equal groups from a whole. 	Understand the relationship between grouping and thedivision statements. 	Understand how to relate division by grouping torepeated subtraction.  There are 4 groups now. *12 divided into groups of 3.* *12 ÷ 3 = 4* *There are 4 groups.*
Using known times-tables to solve divisions	Understand the relationship between multiplication facts and division.  *4 groups of 5 cars is 20 cars in total.20 divided by 4 is 5.*	Link equal grouping with repeated subtraction and known times-table facts to support division.  *40 divided by 4 is 10.* Use a bar model to support understanding of the linkbetween times-table knowledge and division. 	Relate times-table knowledge directly to division. 1 × 10 = 10 2 × 10 = 20 3 × 10 = 30 4 × 10 = 40 5 × 10 = 50 6 × 10 = 60 7 × 10 = 70 8 × 10 = 80  *I know that 3 groups of 10 makes 30, so I know that30 divided by 10 is 3.* *3 × 10 = 30 so 30 ÷ 10 = 3*

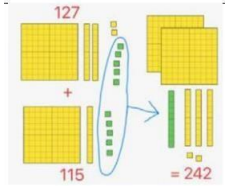
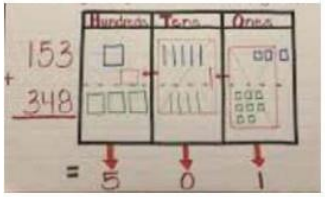
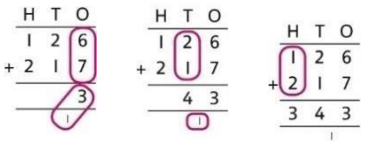
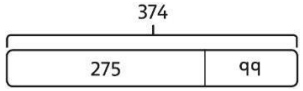
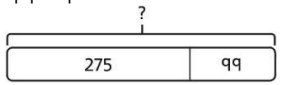
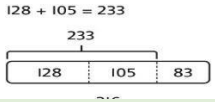
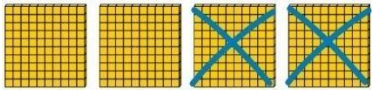
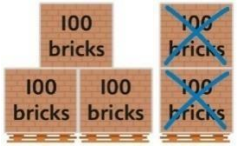
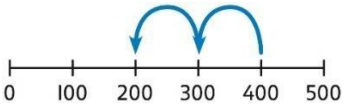
LOWER KEY STAGE 2		
In Years 3 and 4, children develop the basis of written methods by building their skills alongside a deep understanding of place value. They should use known addition/subtraction and multiplication/division facts to calculate efficiently and accurately, rather than relying on counting. Children use place value equipment to support their understanding, but not as a substitute for thinking.		
Addition and subtraction: In Year 3 especially, the column methods are built up gradually. Children will develop their understanding of how each stage of the calculation, includingany exchanges, relates to place value. The example calculations chosen to introduce the stages of each method may often be more suited to a mental method. However, the examples and the progression of the steps have been chosento help children develop their fluency in the process, alongsidea deep understanding of the concepts and the numbers involved, so that they can apply these skills accurately and efficiently to later calculations. The class should be encouraged to compare mental and written methods for specific calculations, and children should be encouraged at every stage to make choices about which methods to apply.In Year 4, the steps are shown without such fine detail, although children should continue to build their understanding with a secure basis in place value. In subtraction, children will need to develop their understanding of exchange as they may need to exchange across one or twocolumns. By the end of Year 4, children should have developed fluencyin column methods alongside a deep understanding, which will allow them to progress confidently in upper Key Stage 2.	Multiplication and division: Children build a solid grounding in times-tables, understanding the multiplication and divisionfacts in tandem. As such, they should be as confident knowing that 35 divided by 7 is 5 as knowing that 5 times 7 is 35. Children develop key skills to support multiplication methods:unitising, commutativity, and how to use partitioning effectively. Unitising allows children to use known facts to multiply anddivide multiples of 10 and 100 efficiently. Commutativity gives children flexibility in applying known facts to calculations and problem solving. An understanding of partitioning allows children to extend their skills to multiplying and dividing 2- and 3-digit numbers by a singledigit. Children develop column methods to support multiplicationsin these cases. For successful division, children will need to make choices about how to partition. For example, to divide 423 by 3, it is effective to partition 423 into 300, 120 and 3, as these can bedivided by 3 using known facts. Children will also need to understand the concept of remainder, in terms of a given calculation and in terms of thecontext of the problem.	Fractions: Children develop the key concept of equivalent fractions, and link this with multiplying and dividing the numerators and denominators, as well as exploring the visualconcept through fractions of shapes. Children learn how to find a fraction of an amount, and develop this with the aid ofa bar model and other representations alongside. in Year 3, children develop an understanding of how to addand subtract fractions with the same denominator and findcomplements to the whole. This is developed alongside anunderstanding of fractions as numbers, including fractionsgreater than 1. In Year 4, children begin to work with fractions greater than 1. Decimals are introduced, as tenths in Year 3 and then as hundredths in Year 4. Children develop an understanding ofdecimals in terms of the relationship with fractions, with dividing by 10 and 100, and also with place value.

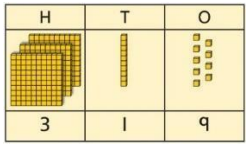
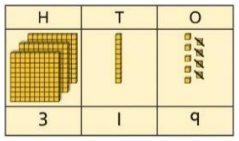
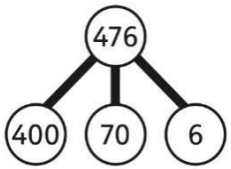
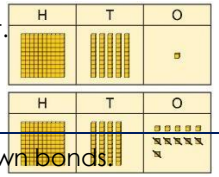
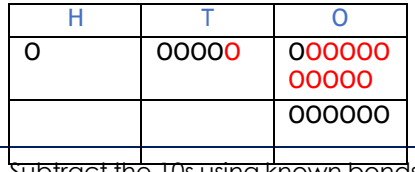
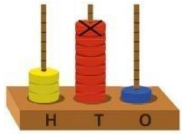
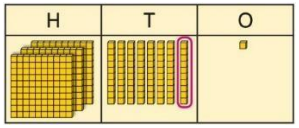
Year 3			
	Concrete	Pictorial	Abstract
Year 3 Addition			
Understanding 100s	Understand the cardinality of 100, and the link with10 tens. Use cubes to place intogroups of 10 tens.  	Unitise 100 and count in steps of 100.  	Represent steps of 100 on a number line and a number track and count up to 1,000 and back to 0. 
Understandin gplace value to 1,000	Unitise 100s, 10s and 1s to build 3-digit numbers.  Use a place value grid to support the structure of numbers to1,000. Place value counters are used alongside other equipment. Children should understand how each counter represents adifferent unitised amount.	Represent the parts of numbers to 1,000 using a part-whole model.  *215 = 200 + 10 + 5*	Recognise numbers to 1,000 represented on a numberline, including those between intervals.
Adding 100s	Use known facts and unitising to add multiples of100. *3 + 4 = 7* *3 hundreds + 4 hundreds = 7 hundreds* *300 + 400 = 700* 	Use known facts and unitising to add multiples of100. *3 + 2 = 5* *3 hundreds + 2 hundreds = 5 hundreds* *300 + 200 = 500*  	Use known facts and unitising to add multiples of100. Represent the addition on a number line. Use a part-whole model to support unitising. *3 + 2 = 5* *300 + 200 = 500*

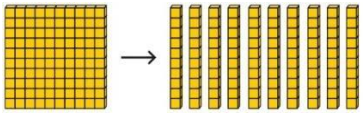
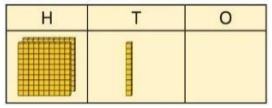
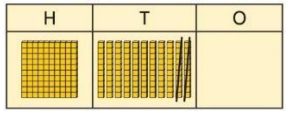
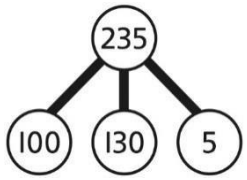
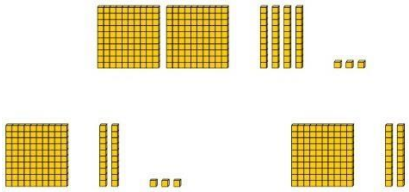
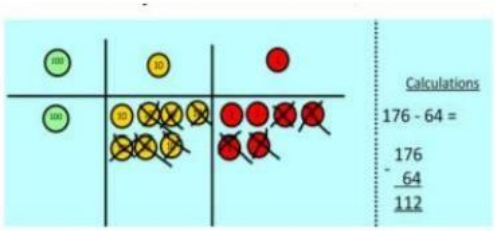
3-digit number + 1s,no exchange or bridging	Use number bonds to add the 1s.  *245 + 4* *5 + 4 = 9* *245 + 4 = 249*	Use number bonds to add the 1s. *245 + 4*  	Understand the link with counting on. Use number bonds to add the 1s and understand thatthis is more efficient and less prone to error. *245 + 4 = ?* *I will add the 1s.* *5 + 4 = 9* *So, 245 + 4 = 249*
3-digit number + 1swith exchange	Understand that when the 1s sum to 10 or more, thisrequires an exchange of 10 ones for 1 ten. Children should explore this using unitised objects orphysical apparatus.  +	Exchange 10 ones for 1 ten where needed. Use a placevalue grid to support the understanding.  *135 + 7 = 142*	Understand how to bridge by partitioning to the 1s tomake the next 10.  *135 + 7 = ?* *135 + 5 + 2 = 142* Ensure that children understand how to add 1sbridging a 100. *198 + 5 = ?* *198 + 2 + 3 = 203*
3-digit number +10s, no exchange	Calculate mentally by forming the number bond forthe 10s.	Calculate mentally by forming the number bond forthe 10s. *351 + 30 = ?*	Calculate mentally by forming the number bond forthe 10s. *753 + 40*

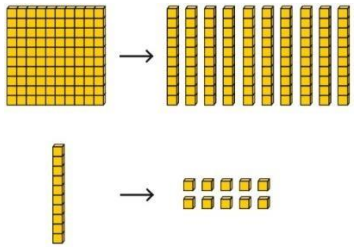
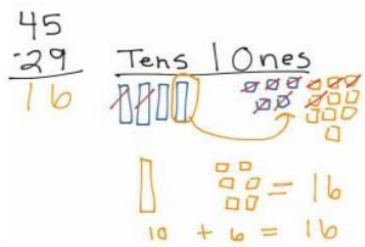
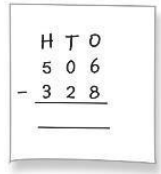
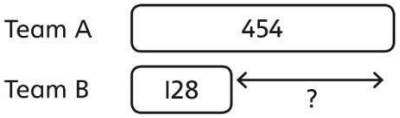
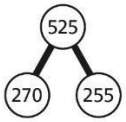
	 *351 + 30 = ?* *5 tens + 3 tens = 8 tens* 351 + 30 = 381	 *5 tens + 3 tens = 8 tens* *351 + 30 = 381*	*I know that 5 + 4 = 9* *So, 50 + 40 = 90* *753 + 40 = 793*
3-digit number + 10s, with exchange	Understand the exchange of 10 tens for 1 hundred. 	Add by exchanging 10 tens for 1 hundred. *184 + 20 = ?*  *184 + 20 = 204*	Understand how the addition relates to counting on in10s across 100.  *184 + 20 = ?* *I can count in 10s … 194 … 204* *184 + 20 = 204* Use number bonds within 20 to support efficientmental calculations. *385 + 50* *There are 8 tens and 5 tens.That is 13 tens.* *385 + 50 = 300 + 130 + 5* *385 + 50 = 435*
3-digit number + 2-digit number	Use place value equipment to make and combinegroups to model addition. 	Use a place value grid to organise thinking andadding of 1s, then 10s.	Use the vertical column method to represent the addition. Children must understand how this relatesto place value at each stage of the calculation.
3-digit number + 2-digit number, exchange required	Use place value equipment to model addition and understand where exchange is required. *Use place value counters to represent*	Represent the required exchange on a place value grid. *275 + 16 = ?*	Use a column method with exchange. Children mustunderstand how the method relates to place value at each stage of the calculation.

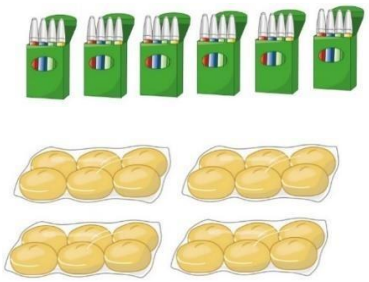
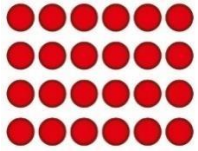
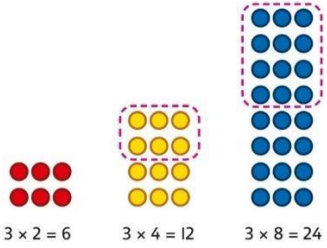
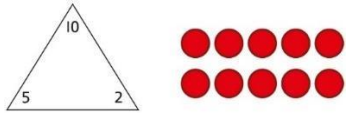
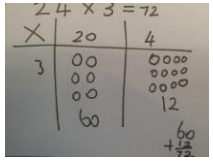
	186 + 27. *Use this to decide if any exchange is required.* *There are 8 tens and 2 tens. That is 10 tens so I will exchange.* 	 *275 + 16 = 291* Note: In this example, a mental method may be more efficient. The numbers for the example calculation have beenchosen to allow children to visualise the concept and see how the method relates to place value. Children should be encouraged at every stage to selectmethods that are accurate and efficient.	 *275 + 16 = 291*
3-digit number + 3-digit number, no exchange	Use place value equipment to make a representation ofa calculation. This may or may not be structured in aplace value grid. *326 + 541 is represented as:* 	Represent the place value grid with equipment tomodel the stages of column addition.  The calculation is shown alongside the model toexpose the structure.	Use a column method to solve efficiently, using known bonds. Children must understand how this relates to place value at every stage of the calculation. 2 2 3 + 1 1 4 3 3 7
3-digit number + 3-digit number, exchange required	Use place value equipment to enact the exchangerequired.	Model the stages of column addition using place valueequipment on a place value grid.	Use column addition, ensuring understanding of placevalue at every stage of the calculation.

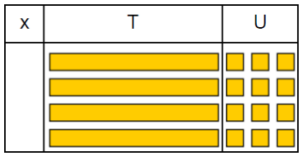
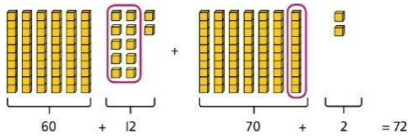
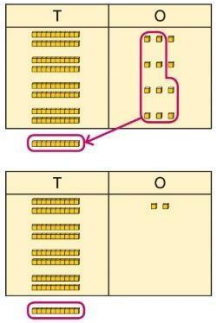
	 *There are 13 ones.* *I will exchange 10 ones for 1 ten.*		 *126 + 217 = 343* Note: Children should also study examples where exchange is required in more than one column, for example *185 + 318 = ?*
Representing addition problems,and selecting appropriate methods	Encourage children to use their own drawings andchoices of place value equipment to represent problems with one or more steps. These representations will help them to selectappropriate methods.	Children understand and create bar models to represent addition problems. *275 + 99 = ?*  *275 + 99 = 374*	Use representations to support choices of appropriatemethods.  *I will add 100, then subtract 1 to find the solution.* *128 + 105 + 83 = ?* *I need to add three numbers.* 
Year 3 Subtraction			
Subtracting 100s	Use known facts and unitising to subtract multiples of 100. Expose the structure alongside pictorial representations.  *4 − 2 = 2* *400 − 200 = 200*	Use known facts and unitising to subtract multiples of100.  *5 − 2 = 3* *500 − 200 = 300*	Understand the link with counting back in 100s.  *400 − 200 = 200* Use known facts and unitising as efficient andaccurate methods. *I know that 7 − 4 = 3. Therefore, I know that 700 − 400 = 300.*

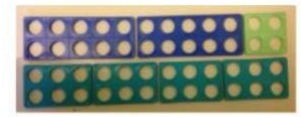
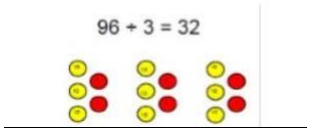
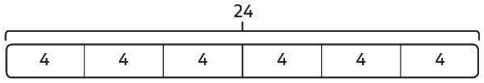
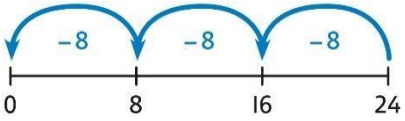
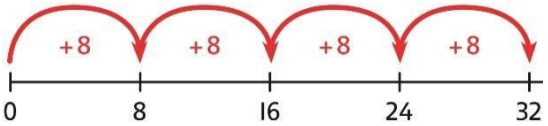
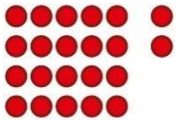
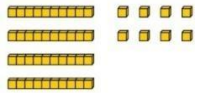
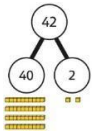
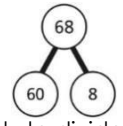
3-digit number − 1s, no exchange	Use number bonds to subtract the 1s.  *319 − 4 = ?*  *9 − 4 = 5* *319 − 4 = 315*	Use number bonds to subtract the 1s. *476 − 4 = ?*  *6 − 4 = 2* *476 − 4 = 472*	Understand the link with counting back using anumber line. Use known number bonds to calculate mentally.
3-digit number − 1s,exchange or bridging required	Understand why an exchange is necessary byexploring why 1 ten must be exchanged. Use place value equipment.  *151 − 6 = ?*	Represent the required exchange on a place value grid.  	Calculate mentally by using known bonds. *151 − 6 = ?* *151 − 1 − 5 = 145*
3-digit number − 10s, no exchange	Subtract the 10s using known bonds. *381 − 10 = ?* *8 tens with 1 removed is 7 tens.*  *381 − 10 = 371*	Subtract the 10s using known bonds.  *8 tens − 1 ten = 7 tens* *381 − 10 = 371*	Use known bonds to subtract the 10s mentally. *372 − 50 = ?* *70 − 50 = 20* *So, 372 − 50 = 322*

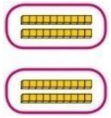
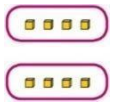
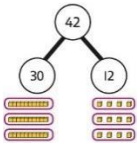
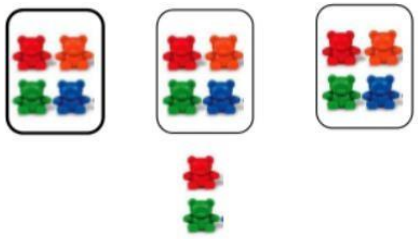
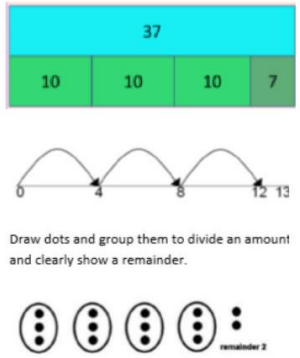
3-digit number −10s, exchange or bridging required	Use equipment to understand the exchange of 1hundred for 10 tens. 	Represent the exchange on a place value grid usingequipment. *210 − 20 = ?*  *I need to exchange 1 hundred for 10 tens, to helpsubtract 2 tens.*  *210 − 20 = 190*	Understand the link with counting back on a numberline. Use flexible partitioning to support the calculation. *235 − 60 = ?*  *235 = 100 + 130 + 5* *235 − 60 = 100 + 70 + 5* *= 175*
3-digit number − up to 3-digit number	Use place value equipment to explore the effect of splitting a whole into two parts, and understand thelink with taking away. 	Represent the calculation on a place value grid.  	Use column subtraction to calculate accurately and efficiently. H T O 9 9 9 − 3 5 2 7 H T O 9 9 9 − 3 5 2 4 7 H T O 9 9 9 − 3 5 2 6 4 7
3-digit number − up to 3-digit number, exchange required	Use equipment to enact the exchange of 1 hundred for10 tens, and 1 ten for 10 ones.	*Model the required exchange on a place value grid.* *175 − 38 = ?* *I need to subtract 8 ones, so I will exchange a ten for10 ones.*	Use column subtraction to workaccurately and efficiently H T O 1 6 15 − 3 8 1 3 7 175 − 38 = 137

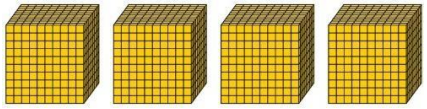
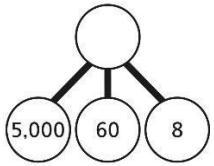
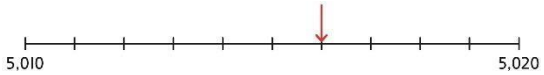
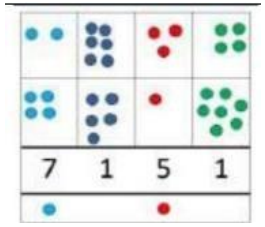
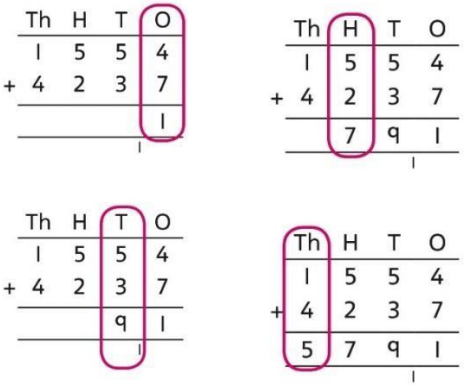
			If the subtraction is a 3-digit number subtract a 2-digit number,children should understand how therecording relates to the place value,and so how to line up the digits correctly. Children should also understand how to exchange in calculations where there is a zeroin the 10s column. 
Representin g subtraction problems		Use bar models to represent subtractions. 'Find the difference' is represented as two bars for comparison.  Bar models can also be used to show that a part mustbe taken away from the whole.	Children use alternative representations to checkcalculations and choose efficient methods. Children use inverse operations to check additions andsubtractions. The part-whole model supports understanding. *I have completed this subtraction.* *525 − 270 = 255* *I will check using addition.*  H T O 2 7 0 + 2 5 5 5 2 5

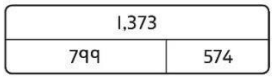
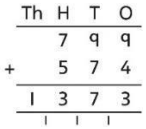
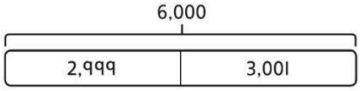
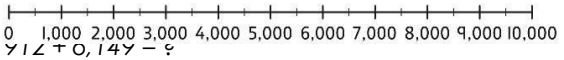
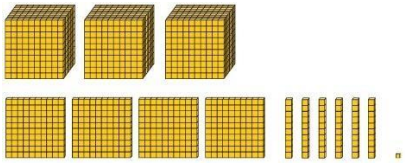
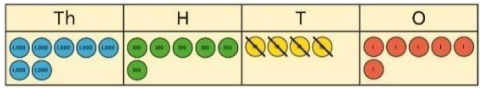
Year 3 Multiplication			
Using commutativity tosupport understanding ofthe times-tables	Understand how to use times-tables facts flexibly.  *There are 6 groups of 4 pens.* *There are 4 groups of 6 bread rolls.* *I can use 6 × 4 = 24 to work out both totals.*	Understand how times-table facts relate tocommutativity.  *6 × 4 = 24* *4 × 6 = 24*	Understand how times-table facts relate to commutativity. *I need to work out 4 groups of 7.* *I know that 7 × 4 =* *28so, I know that* *4 groups of 7 =* *28and* *7 groups of 4 = 28.*
Understanding andusing ×3, ×2, ×4 and ×8 tables.	Children learn the times-tables as 'groups of', but apply their knowledge of commutativity.  *I can use the ×3 table to work out how many keys.I can also use the ×3 table to work out how manybatteries.*	Children understand how the ×2, ×4 and ×8 tables arerelated through repeated doubling.  3 × 2 = 6 3 × 4 = 12 3 × 8 = 24	Children understand the relationship between relatedmultiplication and division facts in known times- tables.  *2 × 5 = 10* *5 × 2 = 10* *10 ÷ 5 = 2* *10 ÷ 2 = 5*
Multiplying a 2-digit number by a1-digit number	Understand how to link partitioning a 2-digit numberwith multiplying. *Each person has 23 flowers.* *Each person has 2 tens and 3 ones.* 	Use place value to support how partitioning is linkedwith multiplying by a 2-digit number. *3 × 24 = ?* *3 × 4 = 12* *3 × 20 = 60* *60 + 12 = 72* *3 × 24 = 72* 	Use addition to complete multiplications of 2-digit numbers by a 1-digit number. *4 × 13 = ?* *4 × 3 = 12* *4 × 10 = 40* *12 + 40 = 52* *4 × 13 = 52*

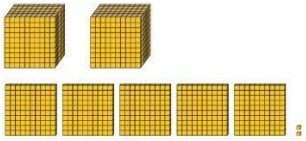
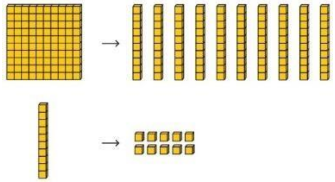
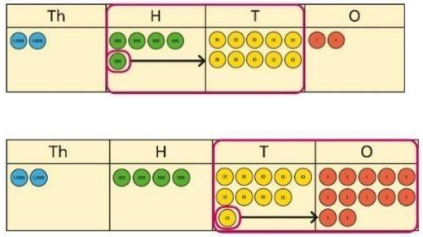
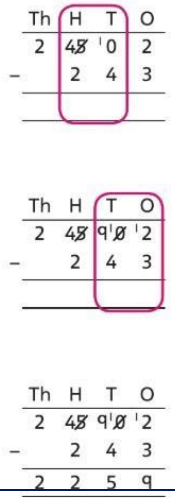
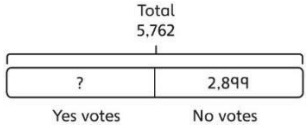
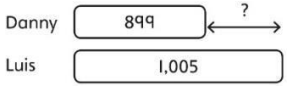
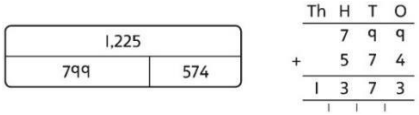
	There are 3 groups of 2 tens.There are 3 groups of 3 ones. Use place value equipment to model the multiplicationcontext alongside the representation.  *There are 4 groups of3 ones.* *There are 4 groups of1 tens.*		
Multiplying a 2-digit number by a1-digit number, expanded column method	Use place value equipment to model how 10 ones areexchanged for a 10 in some multiplications. *3 × 24 = ?* *3 × 20 = 60* *3 × 4 = 12*  *3 × 24 = 60 + 12* *3 × 24 = 70 + 2* *3 × 24 = 72*	Understand that multiplications may require an exchange of 1s for 10s, and also 10s for 100s. *4 × 23 = ?* *4 × 23 = 92*  	Children may write calculations in expanded column form, but must understand the link with place value and exchange. Children are encouraged to write the expanded partsof the calculation separately. *5 × 28 = ?* T O 2 8 × 5 4 0 5 × 8 1 0 0 5 × 20 1 4 0

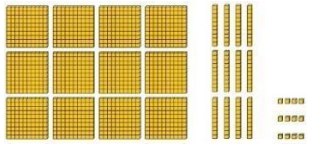
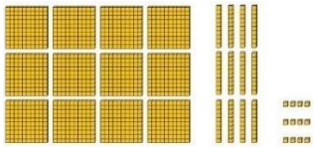
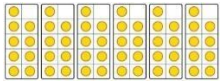
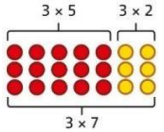
Year 3 Division			
Using times-tables knowledge to divide	Use knowledge of known times-tables to calculatedivisions.  24 divided into groups of 6 = 4  96 ÷ 3 = 32	Use knowledge of known times-tables to calculatedivisions. *I need to work out 30 shared between 5.* *I know that 6 × 5 = 30* *so I know that 30 ÷ 5 = 6.* A bar model may represent the relationship betweensharing and grouping.  24 4 4 4 4 4 4 *24 ÷ 4 = 6* *24 ÷ 6 = 4*	Use knowledge of known times-tables to calculatedivisions. Children understand how division is related to bothrepeated subtraction and repeated addition.  −8 −8 −8 0 8 16 24 *24 ÷ 8 = 3*  +8 +8 +8 +8 0 8 16 24 32 *32 ÷ 8 = 4*
Understandin gremainders	Use equipment to understand that a remainder occurswhen a set of objects cannot be divided equally anyfurther.  *There are 13 sticks in total.* *There are 3 groups of 4, with 1 remainder.*	Use images to explain remainders.  *22 ÷ 5 = 4 remainder 2*	Understand that the remainder is what cannot be shared equally from a set. *22 ÷ 5 = ?* *3 × 5 = 15* *4 × 5 = 20* *5 × 5 = 25 … this is larger than 22* *So, 22 ÷ 5 = 4 remainder 2*
2-digit number divided by 1-digit number, no remainders	Children explore dividing 2-digit numbers by usingplace value equipment.  *48 ÷ 2 = ?*	Children explore which partitions support particular divisions.  42 40 2	Children partition a number into 10s and 1s to dividewhere appropriate. *68 ÷ 2 = ?* *60 ÷ 2 = 30* *8 ÷ 2 = 4* *30 + 4 = 34*  68 60 8 Children partition flexibly to divide where appropriate.

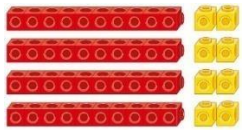
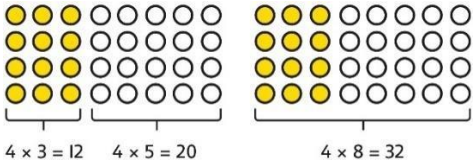
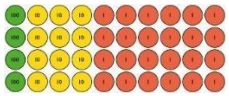
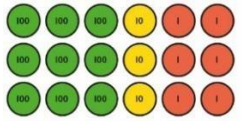
	First divide the 10s.  *Then divide the 1s.* 	*I need to partition 42 differently to divide by 3.*  *42 = 30 + 12* *42 ÷ 3 = 14*	*42 ÷ 3 = ?* *42 = 40 + 2* *I need to partition 42 differently to divideby 3.* *42 = 30 + 12* *30 ÷ 3 = 10* *12 ÷ 3 = 4* *10 + 4 = 14* *42 ÷ 3 = 14*
2-digit number divided by 1-digit number, with remainders	Use place value equipment to understand the conceptof remainder. 	Use place value equipment to understand the conceptof remainder in division.  	Partition to divide, understanding the remainder in context. *67 children try to make 5 equal* *lines.67 = 50 + 17* *50 ÷ 5 = 10* *17 ÷ 5 = 3 remainder 2* *67 ÷ 5 = 13 remainder 2* *There are 13 children in each line and2 children left out.*

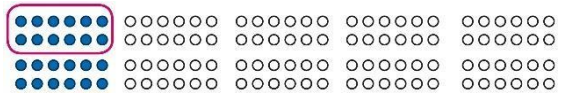
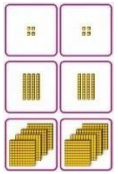
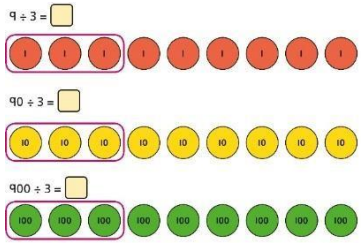
Year 4			
	Concrete	Pictorial	Abstract
Year 4 Addition			
Understanding numbers to 10,000	Use place value equipment to understand the place value of 4-digit numbers.  *4 thousands equal 4,000.* *1 thousand is 10 hundreds.*  2,000 + 500 + 40 + 2 = 2,542	Represent numbers using part-part-whole once children understand the relationship between 1,000s and 100s.  *5,000 + 60 + 8 = 5,068*	Understand partitioning of 4-digit numbers, including numbers with digits of 0. Understand and read 4-digit numbers on a numberline. 
Column additionwith exchange	Use place value equipment on a place value grid toorganise thinking.  Ensure that children understand how the columnsrelate to place value and what to do if the numbersare not all 4-digit numbers.	Use place value equipment to model requiredexchanges.  Include examples that exchange in more than onecolumn.	Use a column method to add, including exchanges.  Include examples that exchange in more than onecolumn.

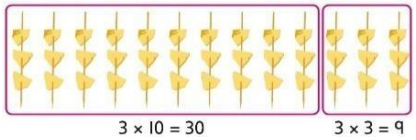
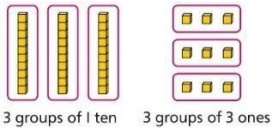
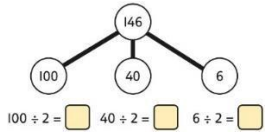
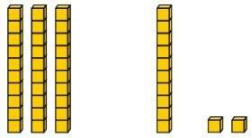
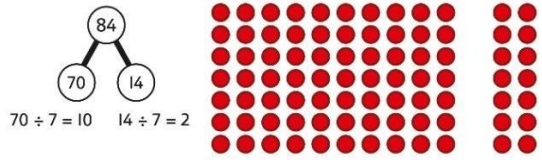
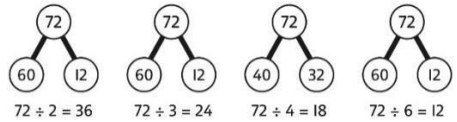
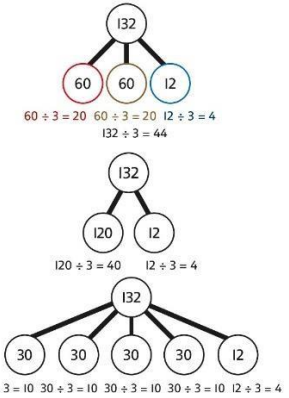
Representing additions and checking strategies		Bar models may be used to represent additions inproblem contexts, and to justify mental methods where appropriate.   *I chose to work out 574 + 800,then subtract 1.*  *This is equivalent to 3,000 + 3,000.*	Use rounding and estimating on a number line tocheck the reasonableness of an addition.  *I used rounding to work out that theanswer should be approximately 1,000 + 6,000 = 7,000.*
Year 4 Subtraction			
Choosing mental methods where appropriate	Use place value equipment to justify mental methods.  *What number will be left if we take away 300?*	Use place value grids to support mental methodswhere appropriate.  *7,646 − 40 = 7,606*	Use knowledge of place value and unitising tosubtract mentally where appropriate. *3,501 − 2,000* *3 thousands − 2 thousands = 1 thousand* *3,501 − 2,000 = 1,501*

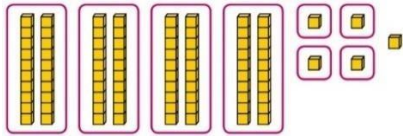
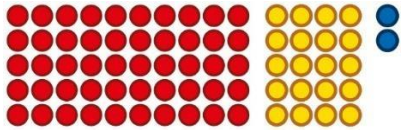
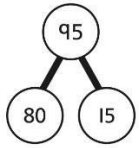
Column subtraction with exchange	Understand why one or more exchanges may benecessary. *2,502 − 243 = ?*  *I need to exchange a 10 for some 1s, but there are notany 10s here.* 	Make exchanges across more than one column wherethere is a zero as a place holder. *2,502 − 243 = ?* 	Make exchanges across more than one column wherethere is a zero as a place holder. *2,502 − 243 = ?* 
Representing subtractions and checking strategies		Use bar models to represent subtractions where a partneeds to be calculated.  *I can work out the total number of Yes votes using 5,762 − 2,899.* Bar models can also represent 'find the difference' as a subtraction problem. 	Use inverse operations to check subtractions. *I calculated 1,225 − 799 = 574.* *I will check by adding the parts.*  *The parts do not add to make 1,225.I must have made a mistake.*

Year 4 Multiplication			
Multiplying by multiples of 10 and100	Use unitising and place value equipment to understand how to multiply by multiples of 1, 10 and100.  *3 groups of 4 ones is 12 ones.* *3 groups of 4 tens is 12 tens.* *3 groups of 4 hundreds is 12 hundreds.*	Use unitising and place value equipment to understand how to multiply by multiples of 1, 10 and100.  *3 × 4 = 12* *3 × 40 = 120* *3 × 400 = 1,200*	Use known facts and understanding of place valueand commutativity to multiply mentally. *4 × 7 = 28* *4 × 70 = 280* *40 × 7 = 280* *4 × 700 = 2,800* *400 × 7 = 2,800*
Understanding times-tables up to12 × 12	Understand the special cases of multiplying by 1 and0.  *5 × 1 = 5* *5 × 0 = 0*	Represent the relationship between the ×9 table andthe ×10 table.  Represent the ×11 table and ×12 tables in relation tothe ×10 table.  *2 × 11 = 20 + 2* *3 × 11 = 30 + 3* *4 × 11 = 40 + 4*  *4 × 12 = 40 + 8*	Understand how times-tables relate to counting patterns. Understand links between the ×3 table, ×6 table and ×9 table *5 × 6 is double 5 × 3* ×5 table and ×6 table *I know that 7 × 5 = 35* *so I know that 7 × 6 = 35 + 7.* ×5 table and ×7 table *3 × 7 = 3 × 5 + 3 × 2*  ×9 table and ×10 table *6 × 10 = 60* *6 × 9 = 60 − 6*

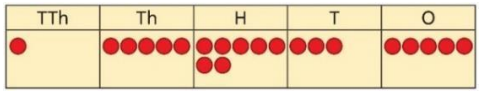
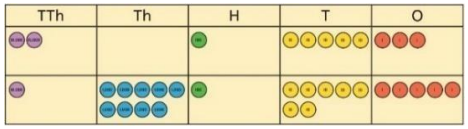
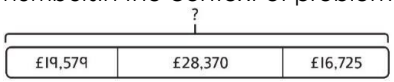
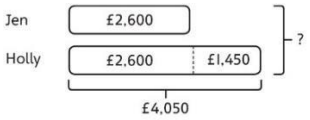
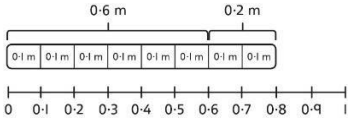
Understanding andusing partitioning in multiplication	Make multiplications by partitioning. *4 × 12 is 4 groups of 10 and 4 groups of 2.*  *4 × 12 = 40 + 8*	Understand how multiplication and partitioning arerelated through addition.  *4 × 3 = 12* *4 × 5 = 20* *12 + 20 = 32* *4 × 8 = 32*	Use partitioning to multiply 2-digit numbers by asingle digit. *18 × 6 = ?* *18 × 6 = 10 × 6 + 8 × 6* *= 60 + 48* *= 108*
Column multiplication for 2- and 3-digit numbers multiplied by asingle digit	Use place value equipment to make multiplications. *Make 4 × 136 using equipment.*  *I can work out how many 1s, 10s and 100s.* *There are 4 × 6 ones… 24 ones* *There are 4 × 3 tens … 12 tens* *There are 4 × 1 hundreds …4* *hundreds24 + 120 + 400 = 544*	Use place value equipment alongside a columnmethod for multiplication of up to 3-digit numbers by a single digit.  3 1 2 × 3 9 3 6	Use the formal column method for up to 3-digit numbers multiplied by a single digit. 3 1 2 × 3 9 3 6 Understand how the expanded column method is related to the formal column method and understand how any exchanges are related to place value at eachstage of the calculation. 2 3 × 5 1 5 1 0 0 1 1 5 2 3 × 5 1 1 5 1
Multiplying more than two numbers	Represent situations by multiplying three numberstogether.	Understand that commutativity can be used to multiply in different orders.	Use knowledge of factors to simplify somemultiplications. *24 × 5 = 12 × 2 × 5*

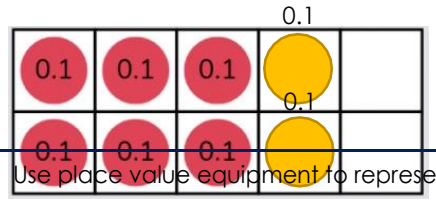
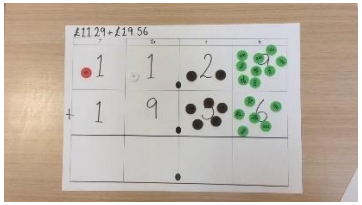
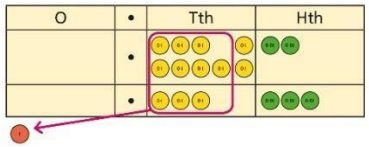
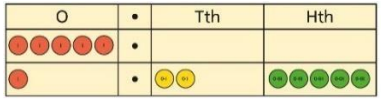
	 *Each sheet has 2 × 5 stickers.There are 3 sheets.* *There are 5 × 2 × 3 stickers in total.* $5 \times 2 \times 3 = 30$ $10 \times 3 = 30$	 *2 × 6 × 10 = 120* *12 × 10 = 120* *10 × 6 × 2 = 120* *60 × 2 = 120*	$12 \times 2 \times 5 =$ $12 \times 10 = 120$ So, $24 \times 5 = 120$
Year 4 Division			
Dividing multiples of 10 and 100 by asingle digit	Use place value equipment to understand how to useunitising to divide.  *8 ones divided into 2 equal groups4 ones in each group* *8 tens divided into 2 equal groups4 tens in each group* *8 hundreds divided into 2 equal groups4 hundreds in each group*	Represent divisions using place value equipment.  *9 ÷ 3 = 3* *9 tens divided by 3 is 3 tens.* *9 hundreds divided by 3 is 3 hundreds.*	Use known facts to divide 10s and 100s by a singledigit. *15 ÷ 3 = 5* *150 ÷ 3 = 50* *1500 ÷ 3 = 500*
Dividing 2-digit and3-digit numbers by a single digit by	Partition into 10s and 1s to divide where appropriate. *39 ÷ 3 = ?*	Partition into 100s, 10s and 1s using Base 10 equipment to divide where appropriate. *39 ÷ 3 = ?*	Partition into 100s, 10s and 1s using a part-whole model to divide where appropriate. *142 ÷ 2 = ?*

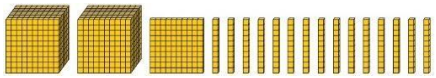
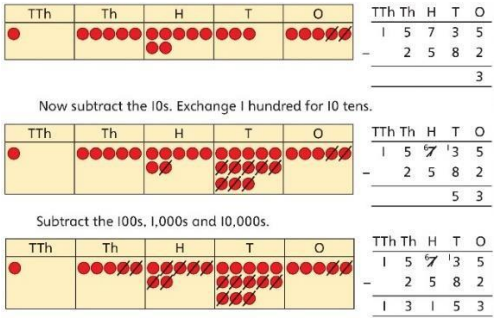
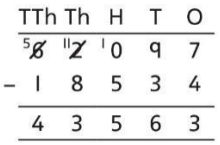
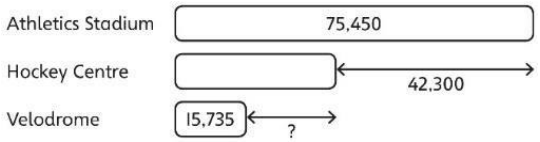
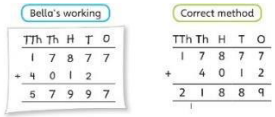
partitioning into 100s, 10s and 1s	 *39 = 30 + 9* *30 ÷ 3 = 10* *9 ÷ 3 = 3* *39 ÷ 3 = 13*	 *39 = 30 + 9* *30 ÷ 3 = 10* *9 ÷ 3 = 3* *39 ÷ 3 = 13*	 *100 ÷ 2 = 50* *40 ÷ 2 = 20* *6 ÷ 2 = 3* *50 + 20 + 3 = 73* *142 ÷ 2 = 73*
Dividing 2-digit and3-digit numbers by a single digit, using flexible partitioning	Use place value equipment to explore why differentpartitions are needed. *42 ÷ 3 = ?* *I will split it into 30 and 12, so that I can divide by 3more easily.* 	Represent how to partition flexibly where needed. *84 ÷ 7 = ?* *I will partition into 70 and 14 because I am dividingby 7.*  84 ÷ 7 = 12	Make decisions about appropriate partitioning basedon the division required.  Understand that different partitions can be used to complete the same division. 
Understandin gremainders	Use place value equipment to find remainders. *85 shared into 4 equal groups*	Represent the remainder as the part that cannot beshared equally.	Understand how partitioning can reveal remainders ofdivisions.

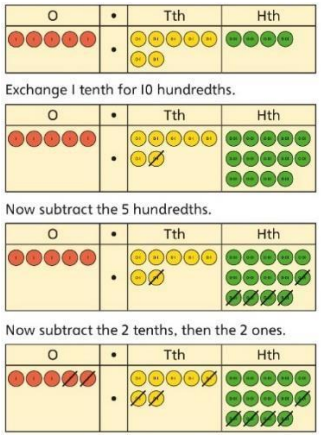
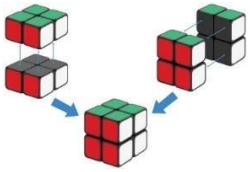
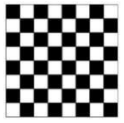
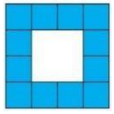
	There are 24, and 1 that cannot be shared. 	 *72 ÷ 5 = 14 remainder 2*	 *80 ÷ 4 = 20* *12 ÷ 4 = 3* *95 ÷ 4 = 23 remainder 3*

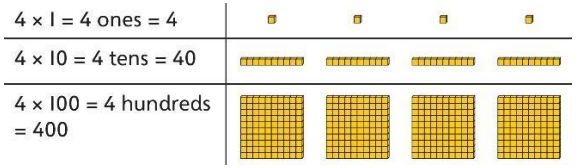
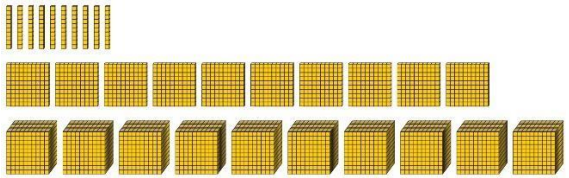
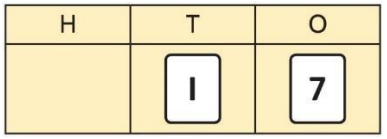
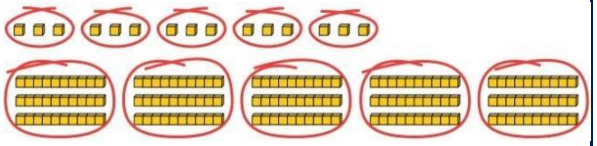
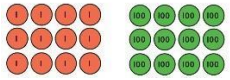
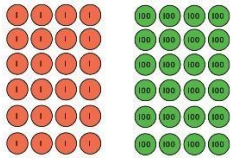
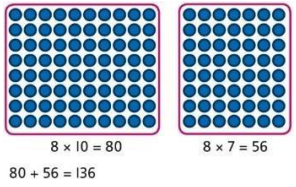
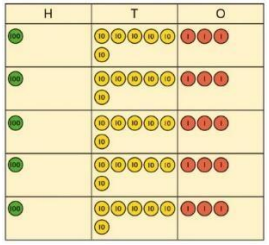
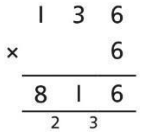
UPPER KEY STAGE 2		
In upper Key Stage 2, children build on secure foundations in calculation, and develop fluency, accuracy and flexibility in their approach to the four operations. They work with whole numbers and adapt their skills to work with decimals, and they continue to develop their ability to select appropriate, accurate and efficient operations.		
Addition and subtraction: Children build on their column methods to add and subtract numbers with up to seven digits, and they adapt the methods to calculate efficientlyand effectively with decimals, ensuring understanding of place value at every stage. Children compare and contrast methods, and they select mental methods or jottings where appropriate and wherethese are more likely to be efficient or accurate when compared with formal column methods. Bar models are used to represent the calculations required to solve problems and may indicate where efficient methods canbe chosen.	Multiplication and division: Building on their understanding,children develop methods to multiply up to 4-digit numbers by single-digit and 2-digit numbers. Children develop column methods with an understanding ofplace value, and they continue to use the key skill of unitisingto multiply and divide by 10, 100 and 1,000. Written division methods are introduced and adapted fordivision by single-digit and 2-digit numbers and are understood alongside the area model and place value. In Year 6, children develop a secure understanding of howdivision is related to fractions. Multiplication and division ofdecimals are also introduced and refined.	Fractions: Children find fractions of amounts, multiply a fraction by a whole number and by another fraction, divide afraction by a whole number, and add and subtract fractionswith different denominators. Children become more confidentworking with improper fractions and mixed numbers and cancalculate with them. Understanding of decimals with up to 3 decimal places is built through place value and as fractions, and children calculate with decimals in the context of measure as well asin pure arithmetic. Children develop an understanding of percentages in relationto hundredths, and they understand how to work with common percentages: 50%, 25%, 10% and 1%.

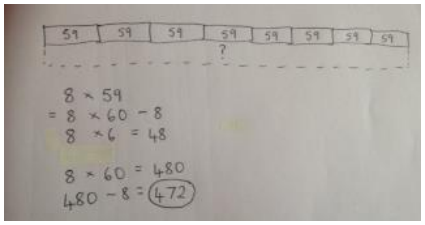
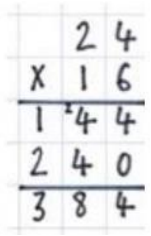
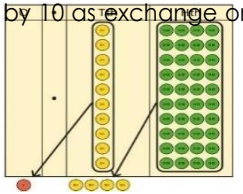
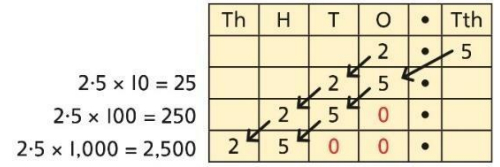
Year 5			
	Concrete	Pictorial	Abstract
Year 5 Addition			
Column additionwith whole numbers	Use place value equipment to represent additions. *Add a row of counters onto the place value grid toshow 15,735 + 4,012.*  	Represent additions, using place value equipment on aplace value grid alongside written methods.  *I need to exchange 10 tens for a 100.* TTh Th H T O 2 0 1 5 3 + 1 9 1 7 5 3 9 3 2 8	Use column addition, including exchanges. TTh Th H T O 1 9 1 7 5 + 1 8 4 1 7 3 7 5 9 2
Representin gadditions		Bar models represent addition of two or more numbersin the context of problem solving.   Th H T O 2 6 0 0 + 1 4 5 0 4 0 5 0 Th H T O 2 6 0 0 + 4 0 5 0 6 6 5 0	Use approximation to check whether answers are reasonable. TTh Th H T O 2 3 4 0 5 + 7 8 9 2 2 0 2 9 7 TTh Th H T O 2 3 4 0 5 + 7 8 9 2 3 1 2 9 7 *I will use 23,000 + 8,000 to check.*
Adding tenths	Link measure with addition of decimals. *Two lengths of fencing are 0·6 m and 0·2 m.How long are they when added together?*	Use a bar model with a number line to add tenths.  	Understand the link with adding fractions. $\frac{6}{10} + \frac{2}{10} = \frac{8}{10}$

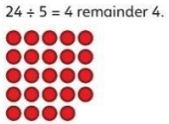
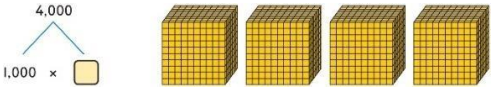
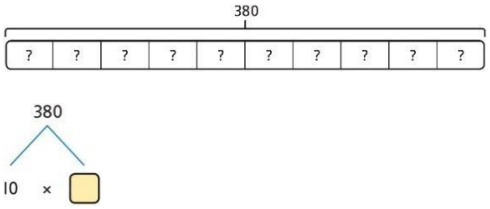
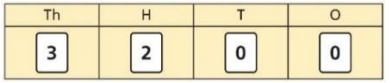
	 	*0·6 + 0·2 = 0·8* *6 tenths + 2 tenths = 8 tenths*	*6 tenths + 2 tenths = 8* *tenths0·6 + 0·2 = 0·8*
Adding decimalsusing column addition	Use place value equipment to represent additions. *Show 0·23 + 0·45 using place value counters.* 	Use place value equipment on a place value grid torepresent additions. Represent exchange where necessary.  O · Tth Hth 0 · 9 2 + 0 · 3 3 1 · 2 5 Include examples where the numbers of decimalplaces are different.  O · Tth Hth 5 · 0 0 + 1 · 2 5 6 · 2 5	Add using a column method, ensuring that childrenunderstand the link with place value. O · Tth Hth 0 · 2 3 + 0 · 4 5 0 · 6 8 Include exchange where required, alongside an understanding of place value. O · Tth Hth 0 · 9 2 + 0 · 3 3 1 · 2 5 Include additions where the numbers of decimalplaces are different. *3.4 + 0.65 = ?* O · Tth Hth 3 · 4 0 + 0 · 6 5 ·

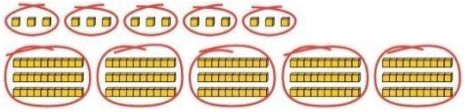
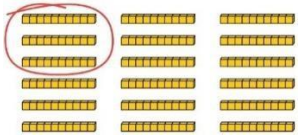
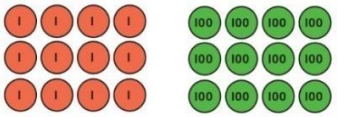
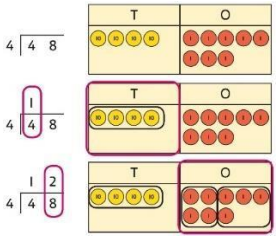
Year 5 Subtraction			
Column subtractionwith whole numbers	Use place value equipment to understand whereexchanges are required. *2,250 – 1,070* 	Represent the stages of the calculation using place value equipment on a grid alongside the calculation,including exchanges where required. *15,735 − 2,582 = 13,153*  	Use column subtraction methods with exchange whererequired. Drawing attention to accuracy and speed.  *62,097 − 18,534 = 43,563*
Checking strategiesand representing subtractions		Bar models represent subtractions in problem contexts, including 'find the difference'.  	Children can explain the mistake made when thecolumns have not been ordered correctly.  Use approximation to check calculations. *I calculated 18,000 + 4,000 mentally to check mysubtraction.*
Choosing efficient methods			To subtract two large numbers that are close, childrenfind the difference by counting on. *2,002 − 1,995 = ?*  Use addition to check subtractions.*I calculated 7,546 − 2,355 = 5,191.I will check using the inverse.*

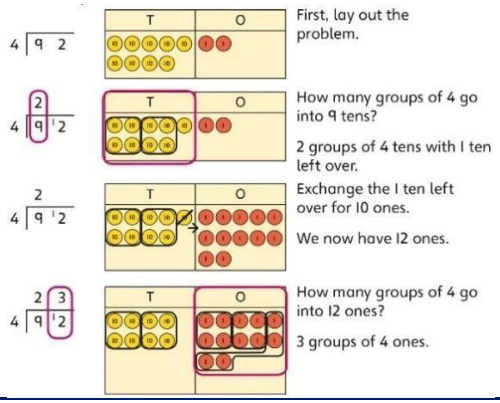
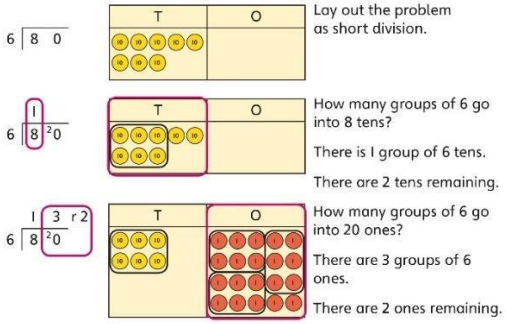
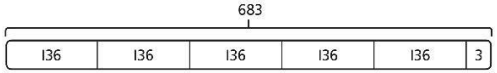
Subtracting decimals	Use a place value counters to represent the stages ofcolumn subtraction, including exchanges where required. *5·74 − 2·25 = ?* 	Use a place value grid to represent the stages of column subtraction, including exchanges where required. Explore complements to a whole number by workingin the context of length.  1 m − ☐ m = ☐ m *1 − 0·49 = ?*	Use column subtraction, with an understanding ofplace value, including subtracting numbers with different numbers of decimal places. *3·921 − 3·75 = ?* O · Tth Hth Thth 3 · 9 2 1 − 3 · 7 5 0 ·
Year 5 Multiplication			
Understandin gfactors	Use cubes or counters to explore the meaning of 'square numbers'. *25 is a square number because it is made from 5 rowsof 5.* Use cubes to explore cube numbers.  *8 is a cube number.*	Use images to explore examples and non-examples ofsquare numbers.  *8 × 8 = 64* $8^2 = 64$  *12 is not a square number, because you cannotmultiply a whole number by itself to make 12.*	Understand the pattern of square numbers in the multiplication tables. Use a multiplication grid to circle each square number.Can children spot a pattern?

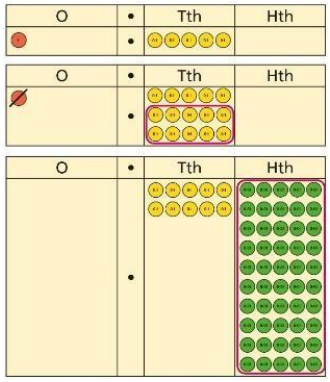
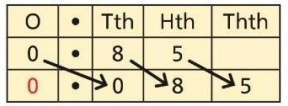
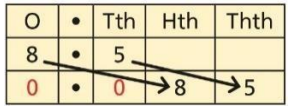
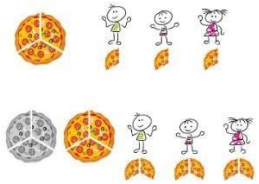
Multiplying by 10, 100 and 1,000	Use place value equipment to multiply by 10, 100 and1,000 by unitising.  	Understand the effect of repeated multiplication by 10. 	Understand how exchange relates to the digits whenmultiplying by 10, 100 and 1,000.  *17 × 10 = 170* *17 × 100 = 17 × 10 × 10 = 1,700* *17 × 1,000 = 17 × 10 × 10 × 10 = 17,000*
Multiplying by multiples of 10, 100 and 1,000	Use place value equipment to explore multiplying byunitising.  *5 groups of 3 ones is 15 ones.* *5 groups of 3 tens is 15 tens.* *So, I know that 5 groups of 3 thousands would be 15thousands.*	Use place value equipment to represent how tomultiply by multiples of 10, 100 and 1,000.  *4 × 3 = 12* *4 × 300 = 1,200*  *6 × 4 = 24* *6 × 400 = 2,400*	Use known facts and unitising to multiply. *5 × 4 = 20* *5 × 40 = 200* *5 × 400 = 2,000* *5 × 4,000 − 20,000* *5,000 × 4 = 20,000*
Multiplying up to 4-digit numbers by a single digit	Explore how to use partitioning to multiply efficiently. *8 × 17 = ?*  *So, 8 × 17 = 136*	Represent multiplications using place value equipmentand add the 1s, then 10s, then 100s, then 1,000s.  	Use a column multiplication, including any requiredexchanges. 

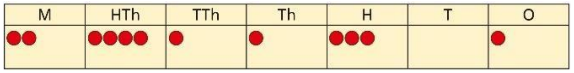
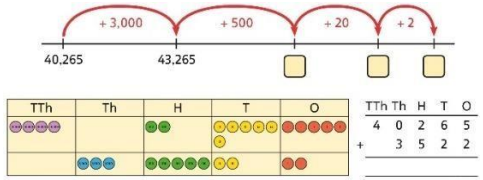
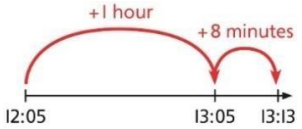
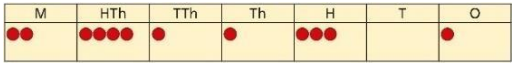
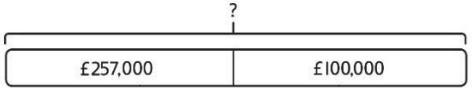
		Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods.  	For children who are not secure with their knowledgeof place value, they will use the expanded method: 2741 X 6 6 — 6 x 1 = 6 (ones x ones) 240 — 6 x 40 = 240 (ones x tens) 4200 — 6 x 700 = 4200 (ones x hundreds) 12000 — 6 ×2000 = 12000 (ones × thousands) 16446 Children should begin by writing down x calculationsthey have done so mistakes can be easily identified.When accuracy improves these can be left out.
Multiplying up to 4-digits by 2-digits	Manipulatives may still be used with the corresponding long multiplication modelled alongside. **Model** | **Calculation**	Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods.	Use a column multiplication, including any requiredexchanges. 
Multiplying decimals by 10, 100 and 1,000	Use place value equipment to explore and understandthe exchange of 10 tenths, 10 hundredths or 10 thousandths.	Represent multiplication by 10 as exchange on a placevalue grid. *0·14 × 10 = 1·4* 	Understand how this exchange is represented on aplace value chart. 

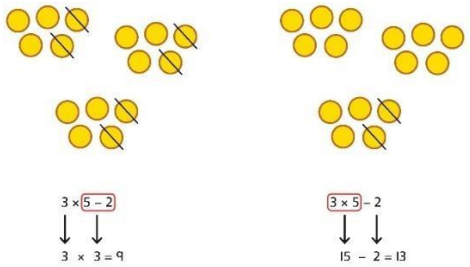
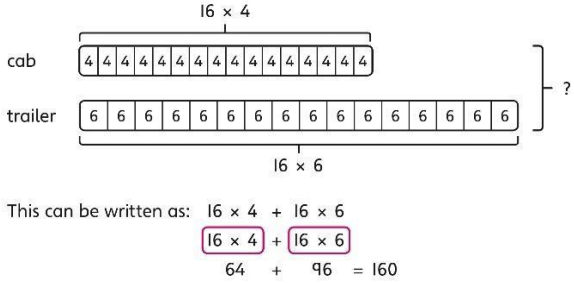
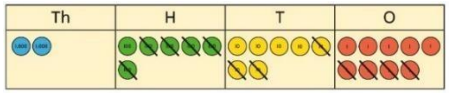
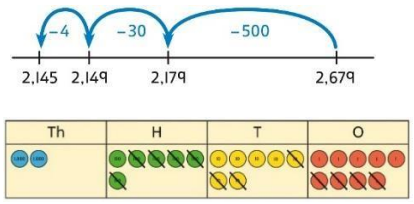
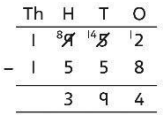
Year 5 Division			
Understanding factors and prime numbers	Use equipment to explore the factors of a givennumber.  *24 ÷ 3 = 8* *24 ÷ 8 = 3* *8 and 3 are factors of 24 because they divide 24exactly.*  *5 is not a factor of 24 because there is a remainder.*	Understand that prime numbers are numbers with exactly two factors. *13 ÷ 1 = 13* *13 ÷ 2 = 6 r 1* *13 ÷ 4 = 4 r 1* *1 and 13 are the only factors of 13.13 is a prime number.*	Understand how to recognise prime and composite numbers. *I know that 31 is a prime number because it can bedivided by only 1 and itself without leaving a remainder.* *I know that 33 is not a prime number as it can bedivided by 1, 3, 11 and 33.* *I know that 1 is not a prime number, as it has only 1factor.*
Dividing whole numbers by 10, 100 and 1,000	Use place value equipment to support unitising fordivision. *4,000 ÷ 1,000*  *4,000 is 4 thousands.* *4 × 1,000= 4,000* *So, 4,000 ÷ 1,000 = 4*	Use a bar model to support dividing by unitising. *380 ÷ 10 = 38*  *380 is 38 tens.* *38 × 10 = 380* *10 × 38 = 380* *So, 380 ÷ 10 = 38*	Understand how and why the digits change on a place value grid when dividing by 10, 100 or 1,000.  *3,200 ÷ 100 = ?* *3,200 is 3 thousands and 2 hundreds.* *200 ÷ 100 = 2* *3,000 ÷ 100 = 30* *3,200 ÷ 100 = 32* *So, the digits will move two places to the right.*
Dividing by multiples of 10, 100 and 1,000	Use place value equipment to represent known factsand unitising.	Represent related facts with place value equipmentwhen dividing by unitising.	Reason from known facts, based on understanding ofunitising. Use knowledge of the inverse relationship to check. *3,000 ÷ 5 = 600*

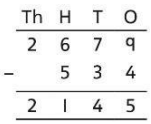
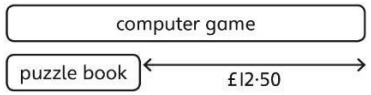
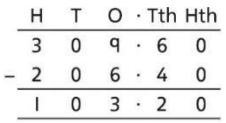
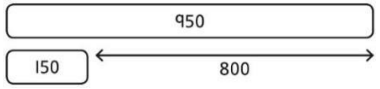
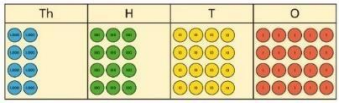
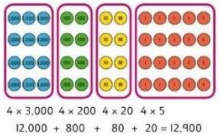
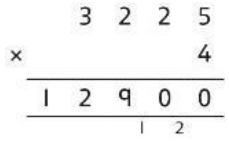
	 *15 ones put into groups of 3 ones. There are 5 groups.15 ÷ 3 = 5* *15 tens put into groups of 3 tens. There are 5 groups.* *150 ÷ 30 = 5*	 *180 is 18 tens.* *18 tens divided into groups of 3 tens. There are 6groups.* *180 ÷ 30 = 6*  *12 ones divided into groups of 4. There are 3 groups.* *12 hundreds divided into groups of 4 hundreds. There are 3 groups.* *1200 ÷ 400 = 3*	*3,000 ÷ 50 = 60* *3,000 ÷ 500 = 6* *5 × 600 = 3,000* *50 × 60 = 3,000* *500 × 6 = 3,000*
Dividing up to fourdigits by a single digit using short division	Explore grouping using place value equipment. *268 ÷ 2 = ?* *There is 1 group of 2 hundreds.There are 3 groups of 2 tens. There are 4 groups of 2 ones.* *264 ÷ 2 = 134*	Use place value equipment on a place value gridalongside short division. The model uses grouping. A sharing model can also be used, although the modelwould need adapting. 	Use short division for up to 4-digit numbers dividedby a single digit. 0 5 5 6 7 | 3 ³8 ³9 ⁴2 *3,892 ÷ 7 = 556* Use multiplication to check. *556 × 7 = ?* *6 × 7 = 42*

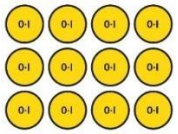
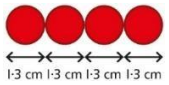
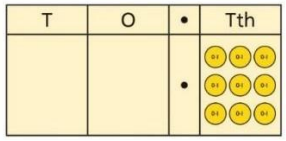
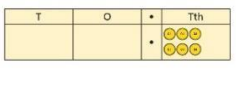
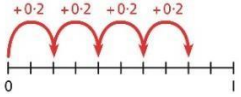
		Lay out the problem as a short division. *There is 1 group of 4 in 4 tens.* *There are 2 groups of 4 in 8 ones.* Work with divisions that require exchange.  	*50 × 7 = 350* *500 × 7 = 3500* *3,500 + 350 + 42 = 3,892*
Understandin gremainders	Understand remainders using concrete versions of a problem. *80 cakes divided into trays of 6.*  *80 cakes in total. They make 13 groups of 6, with 2remaining.*	Use short division and understand remainders as thelast remaining 1s.  	In problem solving contexts, represent divisionsincluding remainders with a bar model.  *683 = 136 × 5 + 3* *683 ÷ 5 = 136 r 3*

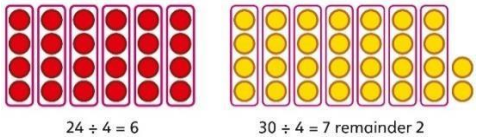
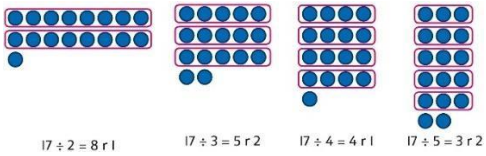
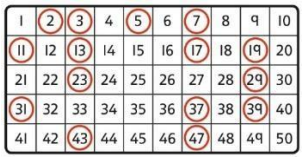
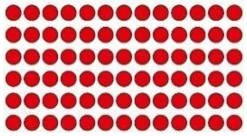
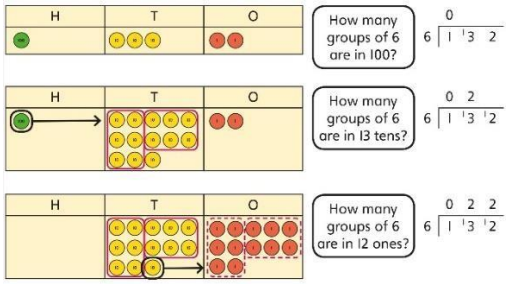
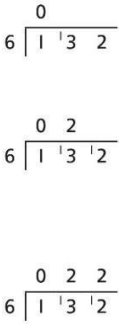
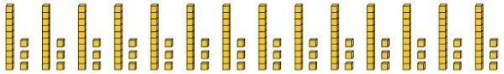
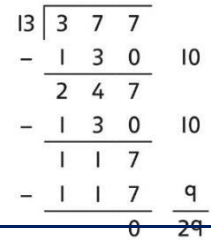
Dividing decimalsby 10, 100 and 1,000	Understand division by 10 using exchange. *2 ones are 20 tenths.* *20 tenths divided by 10 is 2 tenths.*	Represent division using exchange on a place valuegrid.  *1·5 is 1 one and 5 tenths.* *This is equivalent to 10 tenths and 50 hundredths.* *10 tenths divided by 10 is 1 tenth.* *50 hundredths divided by 10 is 5 hundredths.* *1·5 divided by 10 is 1 tenth and 5 hundredths.1·5 ÷ 10 = 0.15*	Understand the movement of digits on a place valuegrid.  *0·85 ÷ 10 = 0·085*  *8·5 ÷ 100 = 0·085*
Understanding the relationship between fractions and division	Use sharing to explore the link between fractions anddivision. *1 whole shared between 3 people.Each person receives one-third.* 	Use a bar model and other fraction representations toshow the link between fractions and division.  $1 \div 3 = \frac{1}{3}$	Use the link between division and fractions tocalculate divisions. $5 \div 4 = 5/4 = 1\frac{1}{4}$ $11 \div 4 = 11/4 = 2\frac{3}{4}$

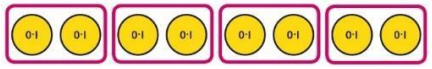
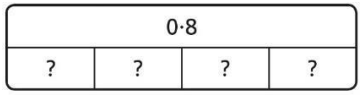
Year 6			
	Concrete	Pictorial	Abstract
Year 6 Addition			
Comparing and selecting efficient methods	Represent 7-digit numbers on a place value grid, anduse this to support thinking and mental methods.  	Discuss similarities and differences between methods,and choose efficient methods based on the specific calculation. Compare written and mental methods alongside placevalue representations.  Use bar model and number line representations tomodel addition in problem-solving and measure contexts.  	Use column addition where mental methods are not efficient. Recognise common errors with column addition. *32,145 + 4,302 = ?* TTh Th H T O 3 2 1 4 5 + 4 3 0 2 3 6 4 4 7 TTh Th H T O 3 2 1 4 5 + 4 3 0 2 7 5 1 6 5 *Which method has been completed accurately?What mistake has been made?* Column methods are also used for decimal additionswhere mental methods are not efficient. H T O · Tth Hth 1 4 0 · 0 9 + 4 9 · 8 9 1 8 9 · 9 8 1
Selecting mental methods for larger numbers where appropriate	Represent 7-digit numbers on a place value grid, anduse this to support thinking and mental methods.  *2,411,301 + 500,000 = ?*	Use a bar model to support thinking in additionproblems. *257,000 + 99,000 = ?*  	Use place value and unitising to support mentalcalculations with larger numbers. *195,000 + 6,000 = ?* *195 + 5 + 1 = 201* *195 thousands + 6 thousands = 201 thousands* *So, 195,000 + 6,000 = 201,000*

	This would be 5 more counters in the HTh *place.So, the total is 2,911,301.* *2,411,301 + 500,000 = 2,911,301*	*I added 100 thousands then subtracted1 thousand.* *257 thousands + 100 thousands = 357 thousands* *257,000 + 100,000 = 357,000* *357,000 – 1,000 = 356,000* *So, 257,000 + 99,000 = 356,000*	
Understanding order of operationsin calculations	Use equipment to model different interpretations of acalculation with more than one operation. Explore different results to draw attention to the structure. *3 × 5 – 2 = ?*  	Model calculations using a bar model to demonstratethe correct order of operations in multi-step calculations.  	Understand the correct order of operations incalculations without brackets. Understand how brackets affect the order of operations in a calculation. *4 + 6 × 16* *4 + 96 = 100* *(4 + 6) × 16* *10 × 16 = 160*
Year 6 Subtraction			
Comparing and selecting efficient methods	Use counters on a place value grid to representsubtractions of larger numbers.  	Compare subtraction methods alongside place valuerepresentations.  	Compare and select methods. Use column subtraction when mental methods are notefficient.  Use column subtraction for decimal problems,including in the context of measure.

		 Use a bar model to represent calculations, including 'find the difference' with two bars as comparison. 	
Subtracting mentally with larger numbers		Use a bar model to show how unitising can supportmental calculations. *950,000 − 150,000* *That is 950 thousands − 150 thousands*  *So, the difference is 800 thousands.* *950,000 − 150,000 = 800,000*	Subtract efficiently from powers of 10. *10,000 − 500 = ?*
Year 6 Multiplication			
Multiplying up to a 4-digit number by asingle digit or 2- digit number.	Use equipment to explore multiplications alongside thewritten calculation.  *4 groups of 2,345* *This is a multiplication:* *4 × 2,345* *2,345 × 4*	Use place value representations alongside the writtenmethod methods where necessary. 	Understand short multiplication. 

Multiplying up to a 4-digit number by a2-digit number		Use an expanded form to expose the structure wherenecessary. 1 2 3 5 × 2 1 5 — 1 × 5 3 0 — 1 × 30 2 0 0 — 1 × 200 1 0 0 0 — 1 × 1,000 1 0 0 — 20 × 5 6 0 0 — 20 × 30 4 0 0 0 — 20 × 200 2 0 0 0 0 — 20 × 1,000 2 5 9 3 5 — 21 × 1,235	Use compact column multiplication with understanding of place value at all stages. 1 2 3 5 × 2 1 1 2 3 5 2 4 7 0 0 2 5 9 3 5
Multiplyin g decimals	Explore decimal multiplications using place valueequipment and in the context of measures.  *3 groups of 4 tenths is 12 tenths.* *4 groups of 3 tenths is 12 tenths.*  *4 × 1 cm = 4 cm* *4 × 0·3 cm = 1.2 cm* *4 × 1·3 = 4 + 1·2 = 5·2 cm*	Represent calculations on a place value grid. 3 × 3 = 9 3 × 0·3 = 0·9  Understand the link between multiplying decimals andrepeated addition.   	Use known facts to multiply decimals. *4 × 3 = 12* *4 × 0·3 = 1·2* *4 × 0·03 = 0·12* *20 × 5 = 100* *20 × 0·5 = 10* *20 × 0·05 = 1* Find families of facts from a known multiplication. *I know that 18 × 4 = 72.* *This can help me work* *out:1·8 × 4 = ?* *18 × 0·4 = ?* *180 × 0·4 = ?* *18 × 0·04 = ?*

Year 6 Division			
Understandin gfactors	Use equipment to explore different factors of anumber.  *4 is a factor of 24 but is not a factor of 30.*	Recognise prime numbers as numbers having exactlytwo factors. Understand the link with division and remainders.  	Recognise and know primes up to 100. Understand that 2 is the only even prime, and that 1is not a prime number. 
Dividing by a single digit	Use equipment to make groups from a total.  *There are 78 in total.* *There are 6 groups of 13.* *There are 13 groups of 6.*	 	Use short division to divide by a single digit. 
Dividing by a 2-digit number usinglong division	Use equipment to build numbers from groups.  *182 divided into groups of 13.There are 14 groups.*	Use bar modelling alongside written division to exposethe structure.	Use long division Write the required multiples to support the divisionprocess. *377 ÷ 13 = ?*  *377 ÷ 13 = 29*

			A slightly different layout may be used, with thedivision completed above rather than at the side. $\begin{array}{r} \quad 3 \\ 21\overline{)\,7\;9\;8} \\ -\;6\;3\;0 \\ \hline \quad 1\;6\;8 \end{array}$ $\begin{array}{r} \quad 3\;8 \\ 21\overline{)\,7\;9\;8} \\ -\;6\;3\;0 \\ \hline \quad 1\;6\;8 \\ -\;1\;6\;8 \\ \hline \qquad 0 \end{array}$ Divisions with a remainder explored in problem-solving contexts.
Dividing decimals	Use place value equipment to explore division ofdecimals.  *8 tenths divided into 4 groups. 2 tenths in each group.*	Use a bar model to represent divisions.  $4 \times 2 = 8$ $\qquad$ $8 \div 4 = 2$ So, $4 \times 0{\cdot}2 = 0{\cdot}8$ $\qquad$ $0{\cdot}8 \div 4 = 0{\cdot}2$	Use short division to divide decimals with up to 2decimal places. $\begin{array}{r} \quad \cdot \\ 8\overline{)\,4\cdot2\;4} \end{array}$ $\begin{array}{r} \quad 0\cdot \\ 8\overline{)\,4\cdot{}^{4}2\;4} \end{array}$ $\begin{array}{r} \quad 0\cdot5 \\ 8\overline{)\,4\cdot{}^{4}2\;{}^{2}4} \end{array}$ $\begin{array}{r} \quad 0\cdot5\;3 \\ 8\overline{)\,4\cdot{}^{4}2\;{}^{2}4} \end{array}$

Times tables expectations

Towngate Primary Academy believe that when children are proficient in times tables it enables them to calculate more efficiently.
Expectations within each year group:

Year 1
Children to be able to count in 2's, 10's and 5's

Year 2
Recall the 2, 10 and 5 multiplication tables, and corresponding division facts.
Summer term introduce 3's.

Year 3
Recall the 2, 10 and 5 multiplication tables, and corresponding division facts.
Recall the 4, 8 and 3 multiplication tables, and corresponding division facts.
Summer term to introduce 6's.

Year 4
Recall the 2, 10 and 5 multiplication tables, and corresponding division facts.
Recall the 4, 8 and 3 multiplication tables, and corresponding division facts.
Recall the 6, 9 and 12 multiplication tables, and corresponding division facts.
Recall the 7 and 11 multiplication tables, and corresponding division facts.
Statutory multiplication check in Spring term.

Year 5 & 6
Rapid recall of all times tables and corresponding division facts through continued practice.