Lower KS2 - Power Maths calculation policy

Power Maths calculation policy, LOWER KS2

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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.

Lower KS2 - Power Maths calculation policy

Key language: partition, place value, tens, hundreds, thousands, column method, whole, part, equal groups, sharing, grouping, bar model

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, including any 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 chosen to help children develop their fluency in the process, alongside a 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 two columns.

By the end of Year 4, children should have developed fluency in 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 division facts 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 and divide 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 single digit.

Children develop column methods to support multiplications in 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 be divided by 3 using known facts.

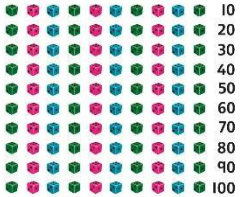
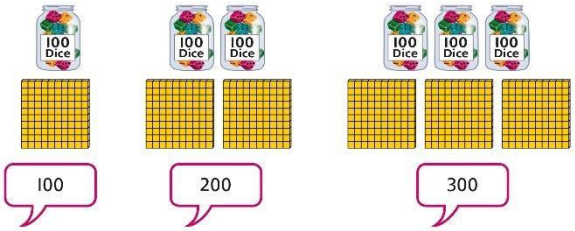
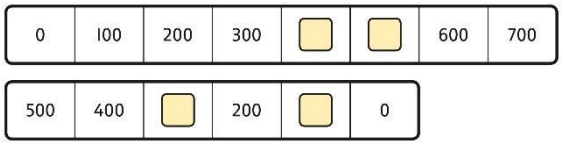
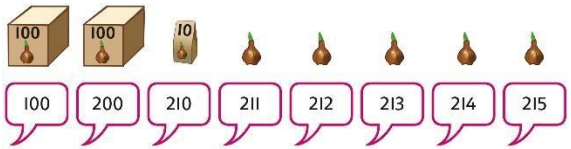
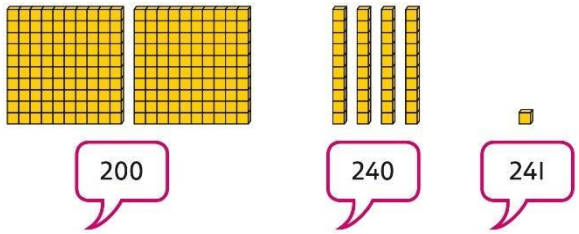
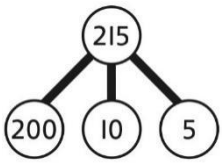
Children will also need to understand the concept of remainder, in terms of a given calculation and in terms of the context of the problem.

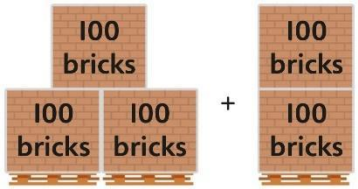
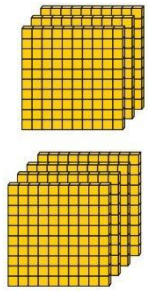
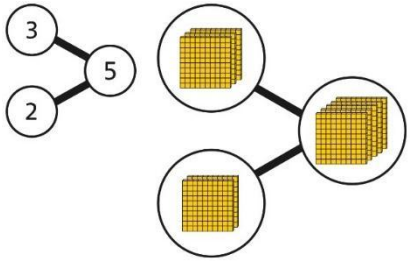
Fractions: Children develop the key concept of equivalent fractions, and link this with multiplying and dividing the numerators and denominators, as well as exploring the visual concept through fractions of shapes. Children learn how to find a fraction of an amount, and develop this with the aid of a bar model and other representations alongside.

in Year 3, children develop an understanding of how to add and subtract fractions with the same denominator and find complements to the whole. This is developed alongside an understanding of fractions as numbers, including fractions greater than 1. In Year 4, children begin to work with fractions greater than 1.

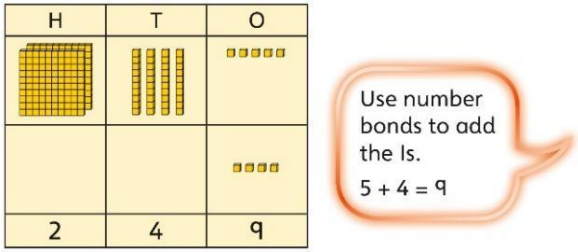
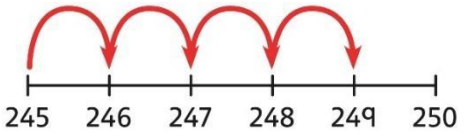
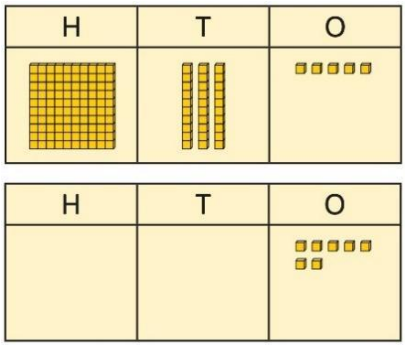
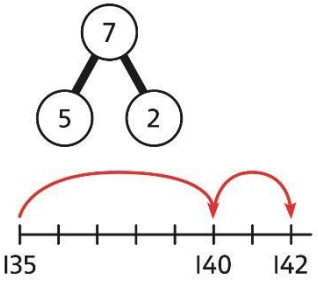
Decimals are introduced, as tenths in Year 3 and then as hundredths in Year 4. Children develop an understanding of decimals in terms of the relationship with fractions, with dividing by 10 and 100, and also with place value.

Lower KS2 - Power Maths calculation policy

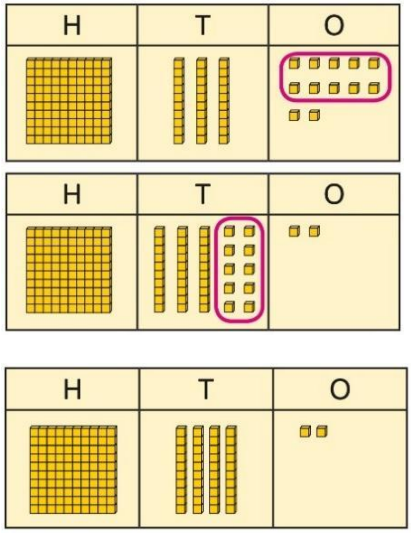
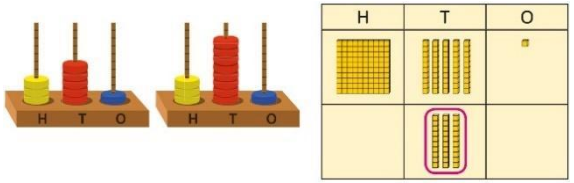
Year 3			
	Concrete	**Pictorial**	**Abstract**
Year 3 Addition			
Understanding 100s ***Green text =*** ***encourage the children to orally share their findings/answer through using STEM sentences****	Understand the cardinality of 100, and the link with 10 tens. Use cubes to place into groups of 10 tens.  How many lots/groups of 10 are there?	Unitise 100 and count in steps of 100.  How many lots/groups of 10 are there?	Represent steps of 100 on a number line and a number track and count up to 1,000 and back to 0.  What can you tell me about the number tracker? What are the intervals? Are the numbers getting larger or smaller? Encourage children to recognise the pattern and the effect this has on the intervals.
Understanding place value to 1,000 ***Green text =*** ***encourage the children to orally share their findings/answe***	Unitise 100s, 10s and 1s to build 3-digit numbers.  	Use equipment to represent numbers to 1,000.  	Represent the parts of numbers to 1,000 using a part-whole model.  *215 = 200 + 10 + 5*

r through using STEM sentences*		Use a place value grid to support the structure of numbers to 1,000. Place value counters are used alongside other equipment. Children should understand how each counter represents a different unitised amount. How many 100s? How many 10s? How many 1s?	Recognise numbers to 1,000 represented on a number line, including those between intervals. How has the number been partitioned?
Adding 100s ***Green text = encourage the children to orally share their findings/answer through using STEM sentences****	Use known facts and unitising to add multiples of 100.  *3 + 2 = 5* *3 hundreds + 2 hundreds = 5 hundreds* *300 + 200 = 500* How can we use our known facts to help us? How many hundreds are in 300? How many hundreds are in 200?	Use known facts and unitising to add multiples of 100.  *3 + 4 = 7* *3 hundreds + 4 hundreds = 7 hundreds* *300 + 400 = 700* If we have 3 hundreds and we add another 4 hundreds that would be the same as 7 hundred. Encourage the children to recognise that equals means the 'same', each side of the number sentence is equal.	Use known facts and unitising to add multiples of 100. Represent the addition on a number line. Use a part-whole model to support unitising.  *3 + 2 = 5* *300 + 200 = 500* What model is being used? How does this help us?

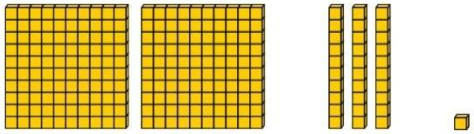
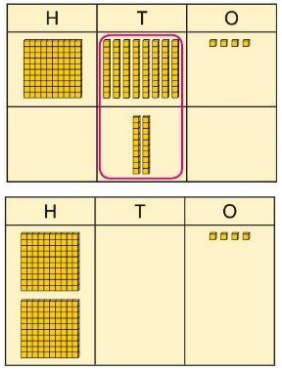
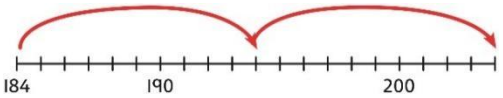
Lower KS2 - Power Maths calculation policy

3-digit number + 1s, no exchange or bridging ***Green text =*** ***encourage the children to orally share their findings/answer through using STEM sentences****	Use number bonds to add the 1s.  *214 + 4 = ?* *Now there are 4 + 4 ones in total.* *4 + 4 = 8* *214 + 4 = 218* What place value are we looking at? What are number bonds?	Use number bonds to add the 1s.  *245 + 4* *5 + 4 = 9* *245 + 4 = 249* I have __ Hundred, __ tens and __ Ones. Altogether I have __	Understand the link with counting on. *245 + 4*  Use number bonds to add the 1s and understand that this is more efficient and less prone to error. *245 + 4 = ?* *I will add the 1s.* *5 + 4 = 9* *So, 245 + 4 = 249* What method is being used? Why?
3-digit number + 1s with exchange ***Green text =*** ***encourage the children to orally share their findings/answer through using STEM sentences****	Understand that when the 1s sum to 10 or more, this requires an exchange of 10 ones for 1 ten. Children should explore this using unitised objects or physical apparatus.	Exchange 10 ones for 1 ten where needed. Use a place value grid to support the understanding. 	Understand how to bridge by partitioning to the 1s to make the next 10.  *135 + 7 = ?* *135 + 5 + 2 = 142*

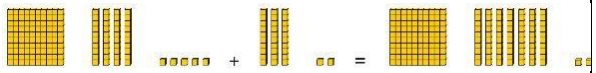
Lower KS2 - Power Maths calculation policy

		 *135 + 7 = 142* How can that be represented differently? I have exchanged __ ones for __ ten. I know I have the same number because ___	Ensure that children understand how to add 1s bridging a 100. *198 + 5 = ?* *198 + 2 + 3 = 203* How can we partition that ones number to make it to then next ten? I have partitioned __ into __ and __.
3-digit number + 10s, no exchange ***Green text =*** ***encourage the children to orally share their findings/answer through***	Calculate mentally by forming the number bond for the 10s.  *234 + 50*	Calculate mentally by forming the number bond for the 10s. *351 + 30 = ?* 	Calculate mentally by forming the number bond for the 10s. *753 + 40* *I know that 5 + 4 = 9* *So, 50 + 40 = 90* *753 + 40 = 793*

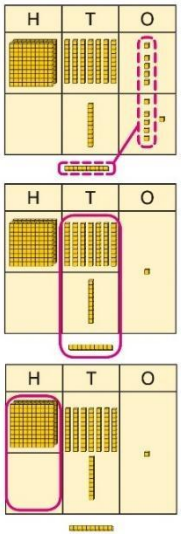
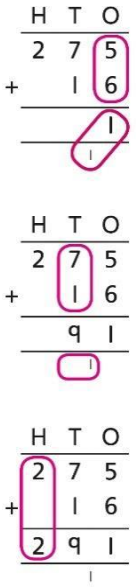
Lower KS2 - Power Maths calculation policy

using STEM sentences*	*There are 3 tens and 5 tens altogether.* *3 + 5 = 8* *In total there are 8 tens.* *234 + 50 = 284* Talk me through what you have drawn out? How can we use of knowledge of tens and partitioning to help us? I have __ tens and __ tens so altogether I have __ tens. I can then add this to the __ hundred and __ ones.	*5 tens + 3 tens = 8 tens* *351 + 30 = 381*	
3-digit number + 10s, with exchange ***Green text =*** ***encourage the children to orally share their findings/answer through using STEM sentences****	Understand the exchange of 10 tens for 1 hundred.  How many Tens in one Hundred? Can you represent 10 Tens in a different way?	Add by exchanging 10 tens for 1 hundred. *184 + 20 = ?*  *184 + 20 = 204*	Understand how the addition relates to counting on in 10s across 100.  *184 + 20 = ?* *I can count in 10s … 194 … 204* *184 + 20 = 204* Use number bonds within 20 to support efficient mental calculations. *385 + 50* *There are 8 tens and 5 tens.* *That is 13 tens.* *385 + 50 = 300 + 130 + 5* *385 + 50 = 435*

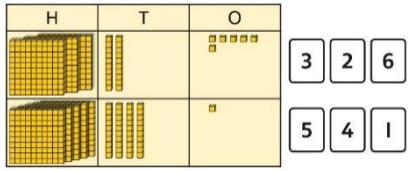
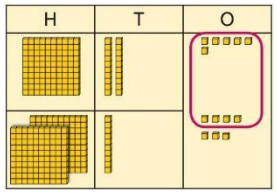
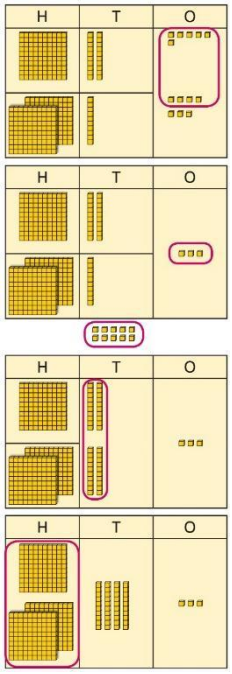
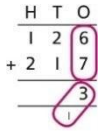
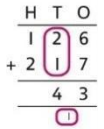
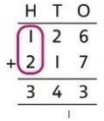
Lower KS2 - Power Maths calculation policy

			How can your number bonds help you? How can partitioning the number help to calculate the sum?
3-digit number + 2-digit number ***Green text =*** ***encourage the children to orally share their findings/answer through using STEM sentences****	Use place value equipment to make and combine groups to model addition. 	Use a place value grid to organise thinking and adding of 1s, then 10s. How many Hundreds do you have? How many Tens do you have? How many Ones do you have?	Use the vertical column method to represent the addition. Children must understand how this relates to place value at each stage of the calculation. How can you partition the numbers to help you?
3-digit number + 2-digit number, exchange required ***Green text =*** ***encourage the children to orally share their findings/answer through***	Use place value equipment to model addition and understand where exchange is required. *Use place value counters to represent 154 + 72.* *Use this to decide if any exchange is required.* *There are 5 tens and 7 tens. That is 12 tens so I will exchange.* Which counters will you need to use?	Represent the required exchange on a place value grid using equipment. *275 + 16 = ?* How many Hundreds do you have? How many Tens do you have? How many Ones do you have? Is any exchange required? How have you represented that?	Use a column method with exchange. Children must understand how the method relates to place value at each stage of the calculation.

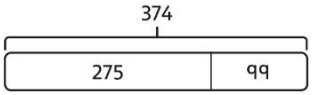
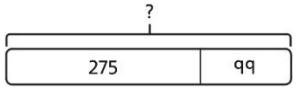
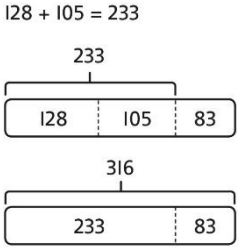
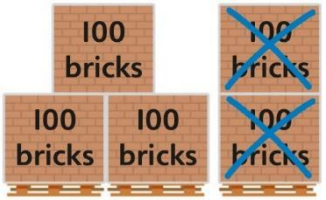
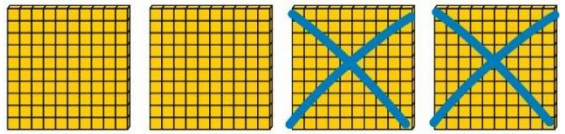
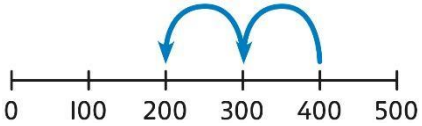
Lower KS2 - Power Maths calculation policy

using STEM sentences*	Explain to me why?	 *275 + 16 = 291* Note: In this example, a mental method may be more efficient. The numbers for the example calculation have been chosen to allow children to visualise the concept and see how the method relates to place value. Children should be encouraged at every stage to select methods that are accurate and efficient.	 *275 + 16 = 291*
3-digit number + 3-digit number, no exchange ***Green text =**	Use place value equipment to make a representation of a calculation. This may or may not be structured in a place value grid. *326 + 541 is represented as:*	Represent the place value grid with equipment to model the stages of column addition. *How many Hundreds do you have?* *How many Tens do you have?* *How many Ones do you have?* *Is any exchange required?*	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.

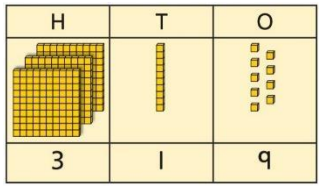
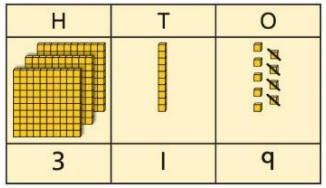
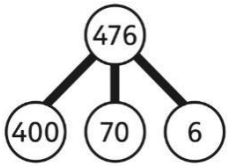
Lower KS2 - Power Maths calculation policy

encourage the children to orally share their findings/answer through using STEM sentences*	 Which counters will you need to use? Explain to me why?	*How have you represented that?*	
3-digit number + 3-digit number, exchange required ***Green text =** ***encourage the children to orally share their findings/answer through using STEM sentences****	Use place value equipment to enact the exchange required.  *There are 13 ones.* *I will exchange 10 ones for 1 ten.* How have you represented this?	Model the stages of column addition using place value equipment on a place value grid. 	Use column addition, ensuring understanding of place value at every stage of the calculation.    *126 + 217 = 343* Note: Children should also study examples where exchange is required in more than one column, for example *185 + 318 = ?*

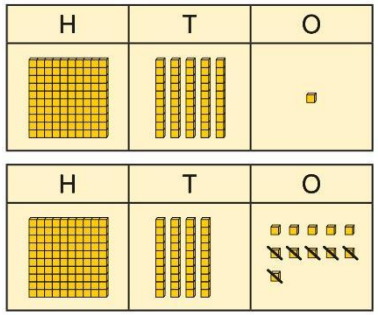
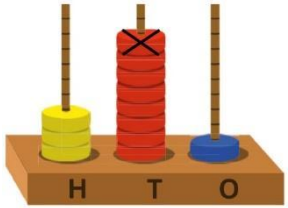
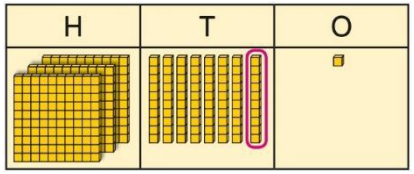
Lower KS2 - Power Maths calculation policy

Representing addition problems, and selecting appropriate methods ***Green text =** ***encourage the children to orally share their findings/answer through using STEM sentences****	Encourage children to use their own drawings and choices of place value equipment to represent problems with one or more steps. These representations will help them to select appropriate methods.	Children understand and create bar models to represent addition problems. *275 + 99 = ?*  *275 + 99 = 374* Explain how you have used the bar model?	Use representations to support choices of appropriate methods.  *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 ***Green text =** ***encourage the children to orally share their findings/answer through using STEM sentences****	Use known facts and unitising to subtract multiples of 100.  *5 − 2 = 3* *500 − 200 = 300*	Use known facts and unitising to subtract multiples of 100.  *4 − 2 = 2* *400 − 200 = 200*	Understand the link with counting back in 100s.  *400 − 200 = 200* Use known facts and unitising as efficient and accurate methods.

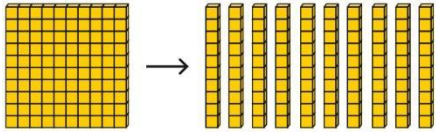
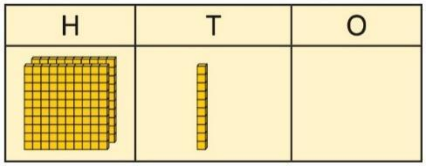
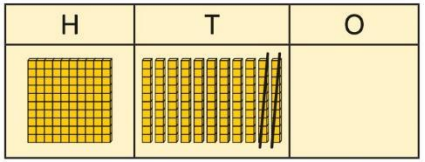
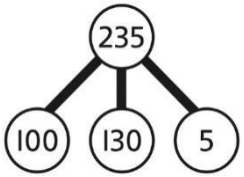
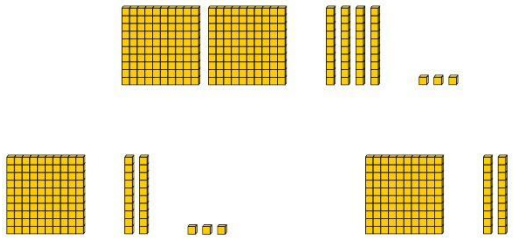
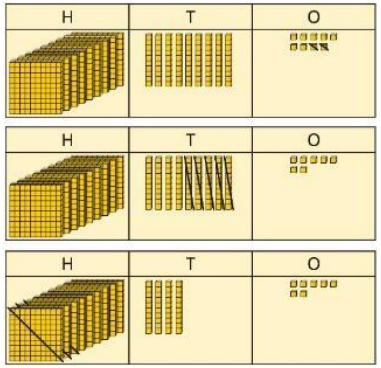
Lower KS2 - Power Maths calculation policy

	Explain you answer to me? I have crossed out __ blocks because the sum is __ - __ = __		*I know that 7 − 4 = 3. Therefore, I know that 700 − 400 = 300.* I know that 700 – 400 = 300 because 7 – 4 = 3
3-digit number − 1s, no exchange ***Green text =*** ***encourage the children to orally share their findings/answer through using STEM sentences***	Use number bonds to subtract the 1s.  *214 − 3 = ?*  *4 − 3 = 1* *214 − 3 = 211* Explain your answer to me?	Use number bonds to subtract the 1s.  *319 − 4 = ?*  *9 − 4 = 5* *319 − 4 = 315*	Understand the link with counting back using a number line. Use known number bonds to calculate mentally. *476 − 4 = ?*  *6 − 4 = 2* *476 − 4 = 472* How can you partition the number? Which number do you subtract the ones (2) from? Why?
3-digit number − 1s, exchange or bridging required	Understand why an exchange is necessary by exploring why 1 ten must be exchanged. Use place value equipment.	Represent the required exchange on a place value grid. *151 − 6 = ?*	Calculate mentally by using known bonds. *151 − 6 = ?* *151 − 1 − 5 = 145*

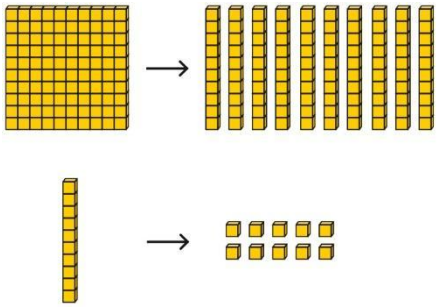
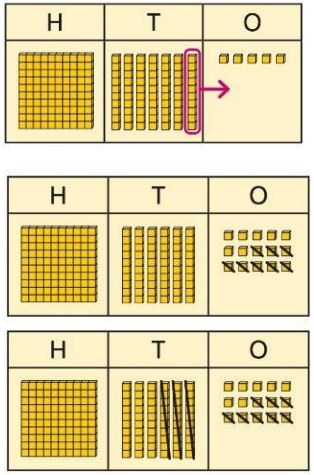
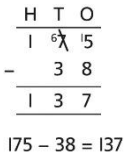
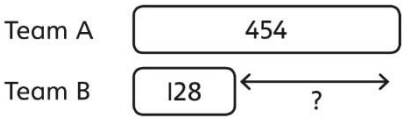
Lower KS2 - Power Maths calculation policy

Green text = ***encourage the children to orally share their findings/answer through using STEM sentences****	How can you represent your working out and your answer? Explain your answer to me. How do you know you are correct?	 Explain your answer to me. How do you know you are correct?	Explain the strategy you have used?
3-digit number − 10s, no exchange ***Green text =*** ***encourage the children to orally share their findings/answer through using STEM sentences****	Subtract the 10s using known bonds.  *381 − 10 = ?* *8 tens with 1 removed is 7 tens.* *381 − 10 = 371* 81 – 10 is 71 so 281 – 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* I Know that 7 – 2 = 20 So 70 -50 = 20 So 372 – 50 = 322
3-digit number − 10s, exchange or	Use equipment to understand the exchange of 1 hundred for 10 tens.	Represent the exchange on a place value grid using equipment. *210 − 20 = ?*	Understand the link with counting back on a number line.

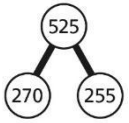
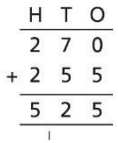
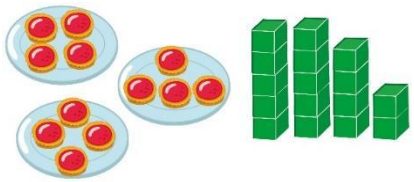
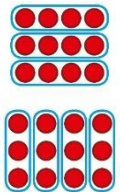
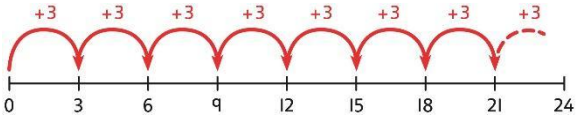
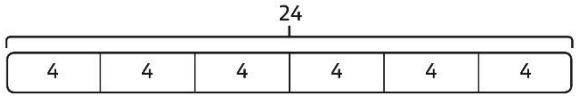
Lower KS2 - Power Maths calculation policy

bridging required ***Green text =*** ***encourage the children to orally share their findings/answer through using STEM sentences****	 Explain your answer to me.	 *I need to exchange 1 hundred for 10 tens, to help subtract 2 tens.*  *210 − 20 = 190*	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 ***Green text =*** ***encourage the children to orally share their findings/answer through using STEM sentences****	Use place value equipment to explore the effect of splitting a whole into two parts, and understand the link with taking away.  *How can you partition the numbers to help you?*	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

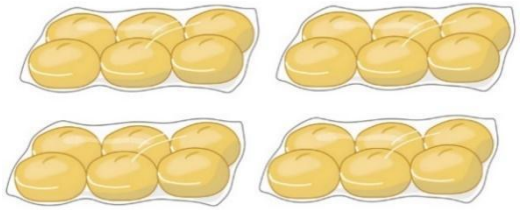
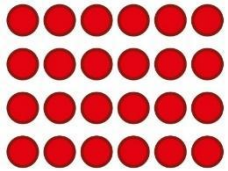
Lower KS2 - Power Maths calculation policy

	What would you put into your part, part, whole?		
3-digit number − up to 3-digit number, exchange required ***Green text =*** ***encourage the children to orally share their findings/answer through using STEM sentences****	Use equipment to enact the exchange of 1 hundred for 10 tens, and 1 ten for 10 ones.  Explain how you have used the equipment? Is 1 ten the same as 10 ones? How do you know? ! know that 1 ten is the dame as 10 ones because ……	*Model the required exchange on a place value grid.* *175 − 38 = ?* *I need to subtract 8 ones, so I will exchange a ten for 10 ones.*  	Use column subtraction to work accurately and efficiently.  175 − 38 = 137 If the subtraction is a 3-digit number subtract a 2-digit number, children should understand how the recording 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 zero in the 10s column. 
Representing subtraction problems ***Green text =*** ***encourage the children to orally share their findings/answe***		Use bar models to represent subtractions. 'Find the difference' is represented as two bars for comparison.  	Children use alternative representations to check calculations and choose efficient methods. Children use inverse operations to check additions and subtractions. The part-whole model supports understanding. *I have completed this subtraction.*

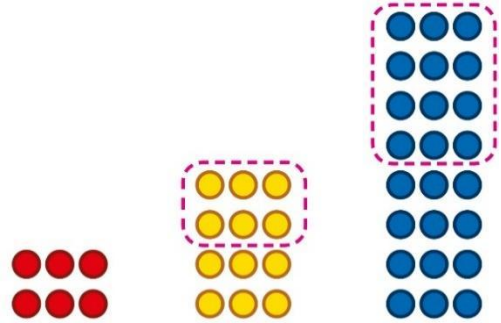
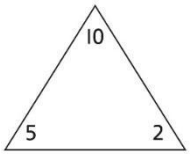
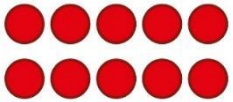
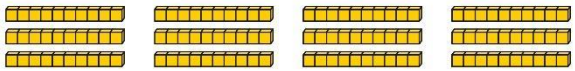
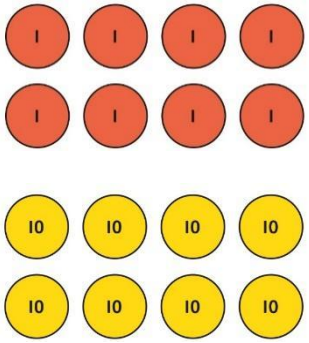
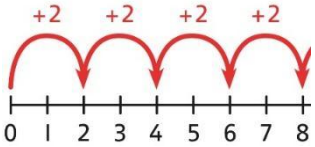
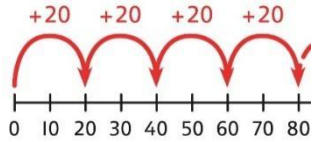
Lower KS2 - Power Maths calculation policy

r through using STEM sentences*		Bar models can also be used to show that a part must be taken away from the whole.	*525 − 270 = 255* *I will check using addition.*  
Year 3 Multiplication			
Understanding equal grouping and repeated addition ***Green text =*** ***encourage the children to orally share their findings/answer through using STEM sentences****	Children continue to build understanding of equal groups and the relationship with repeated addition. They recognise both examples and non-examples using objects.  Children recognise that arrays can be used to model commutative multiplications.	Children recognise that arrays demonstrate commutativity.  *This is 3 groups of 4.* *This is 4 groups of 3.* I know that 3 groups of 4 totals the same as 4 groups of 3 because …….	Children understand the link between repeated addition and multiplication.  *8 groups of 3 is 24.* *3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 = 24* *8 × 3 = 24* A bar model may represent multiplications as equal groups.  *6 × 4 = 24*

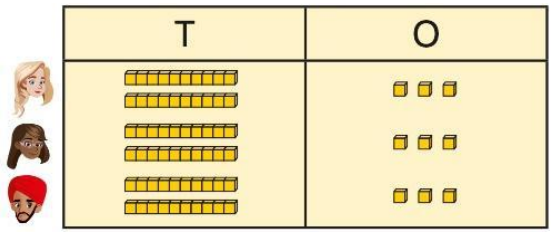
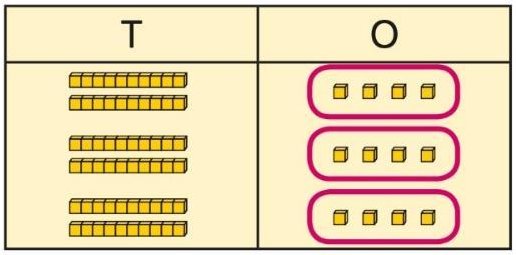
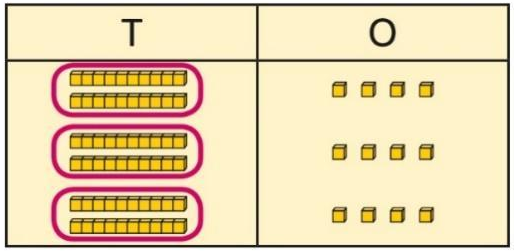
Lower KS2 - Power Maths calculation policy

	 *I can see 3 groups of 8.* *I can see 8 groups of 3.*		
Using commutativity to support understanding of the times-tables ***Green text =*** ***encourage the children to orally share their findings/answer through using STEM sentences****	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 to commutativity.  *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 = 28 so, I know that 4 groups of 7 = 28 and 7 groups of 4 = 28.

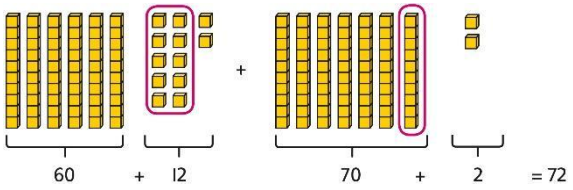
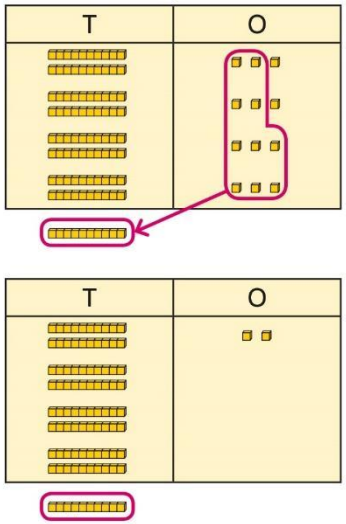
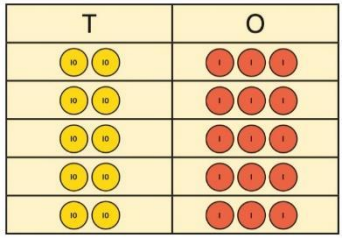
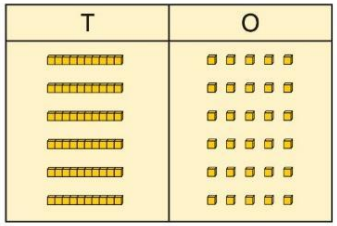
Lower KS2 - Power Maths calculation policy

Understanding and using ×3, ×2, ×4 and ×8 tables. ***Green text =*** ***encourage the children to orally share their findings/answer through using STEM sentences****	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 many batteries.* I know that 3 x __ is __ because	Children understand how the ×2, ×4 and ×8 tables are related through repeated doubling.  3 × 2 = 6 3 × 4 = 12 3 × 8 = 24	Children understand the relationship between related multiplication and division facts in known times-tables.   *2 × 5 = 10* *5 × 2 = 10* *10 ÷ 5 = 2* *10 ÷ 2 = 5*
Using known facts to multiply 10s, for example 3 × 40 ***Green text =*** ***encourage the children to orally share their findings/answer through using STEM sentences****	Explore the relationship between known times-tables and multiples of 10 using place value equipment. *Make 4 groups of 3 ones.*  *Make 4 groups of 3 tens.*  *What is the same?* *What is different?* *I know that 10 x __ is __ because*	Understand how unitising 10s supports multiplying by multiples of 10.  *4 groups of 2 ones is 8 ones.* *4 groups of 2 tens is 8 tens.* *4 × 2 = 8*	Understand how to use known times-tables to multiply multiples of 10.   *4 × 2 = 8* *4 × 20 = 80*

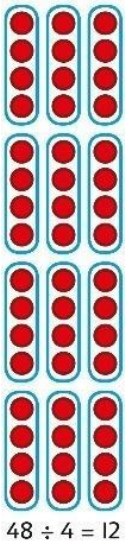
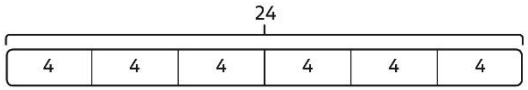
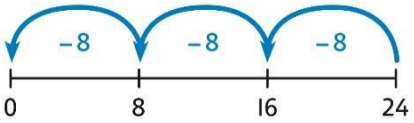
Lower KS2 - Power Maths calculation policy

		4 × 20 = 80	
Multiplying a 2-digit number by a 1-digit number ***Green text =*** ***encourage the children to orally share their findings/answer through using STEM sentences****	Understand how to link partitioning a 2-digit number with multiplying. *Each person has 23 flowers.* *Each person has 2 tens and 3 ones.*  *There are 3 groups of 2 tens.* *There are 3 groups of 3 ones.* Use place value equipment to model the multiplication context.  *There are 3 groups of 3 ones.* *There are 3 groups of 2 tens.*	Use place value to support how partitioning is linked with 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*

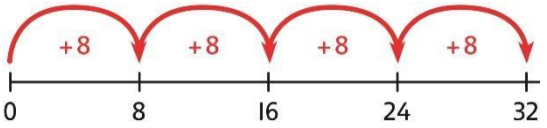
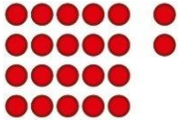
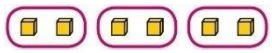
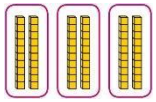
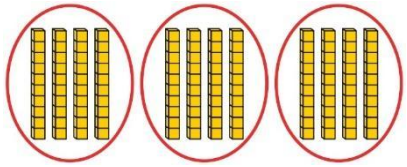
Lower KS2 - Power Maths calculation policy

	Explain you answer to me.		
Multiplying a 2-digit number by a 1-digit number, expanded column method ***Green text =*** ***encourage the children to orally share their findings/answer through using STEM sentences****	Use place value equipment to model how 10 ones are exchanged 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*  *5 × 23 = ?*	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 parts of the calculation separately.  T O 1 5 × 6 + 6 × 5 6 × 10 *5 × 28 = ?* T O 2 8 × 5 4 0 5 × 8 1 0 0 5 × 20 1 4 0

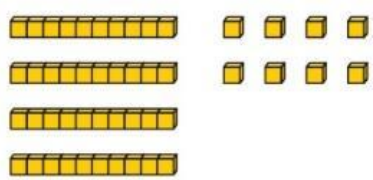
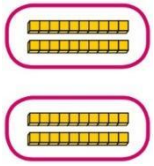
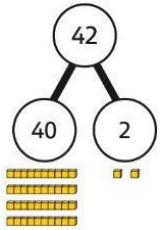
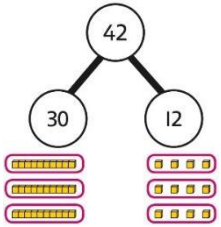
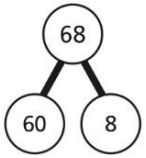
Lower KS2 - Power Maths calculation policy

		5 × 3 = 15 *5 × 20 = 100* *5 × 23 = 115*	
Year 3 Division			
Using times-tables knowledge to divide ***Green text =*** ***encourage the children to orally share their findings/answer through using STEM sentences****	Use knowledge of known times-tables to calculate divisions.  *24 divided into groups of 8.* *There are 3 groups of 8.* Think about the inverse? How can you use what you know about multiplication facts to help with your division facts?	Use knowledge of known times-tables to calculate divisions.  48 ÷ 4 = 12 *48 divided into groups of 4.* *There are 12 groups.* *4 × 12 = 48* *48 ÷ 4 = 12*	Use knowledge of known times-tables to calculate divisions. *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 between sharing and grouping.  *24 ÷ 4 = 6* *24 ÷ 6 = 4* Children understand how division is related to both repeated subtraction and repeated addition.  *24 ÷ 8 = 3*

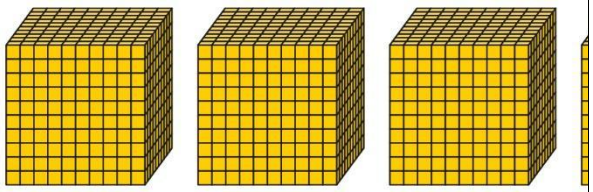
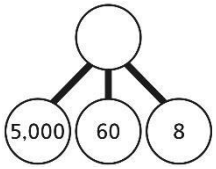
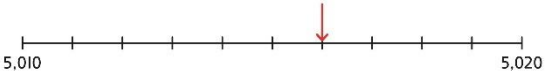
Lower KS2 - Power Maths calculation policy

			 *32 ÷ 8 = 4*
Understanding remainders ***Green text =*** ***encourage the children to orally share their findings/answer through using STEM sentences****	Use equipment to understand that a remainder occurs when a set of objects cannot be divided equally any further.  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
Using known facts to divide multiples of 10 ***Green text =*** ***encourage the children to orally share their findings/answer through using STEM sentences****	Use place value equipment to understand how to divide by unitising. Make 6 ones divided by 3.  Now make 6 tens divided by 3.  What is the same? What is different?	Divide multiples of 10 by unitising.  12 tens shared into 3 equal groups. 4 tens in each group.	Divide multiples of 10 by a single digit using known times-tables. 180 ÷ 3 = ? 180 is 18 tens. 18 divided by 3 is 6. 18 tens divided by 3 is 6 tens. 18 ÷ 3 = 6 180 ÷ 3 = 60

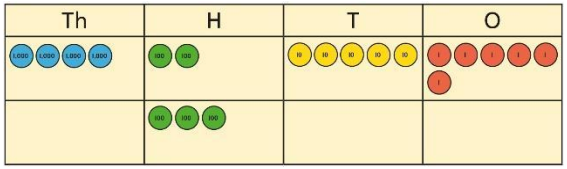
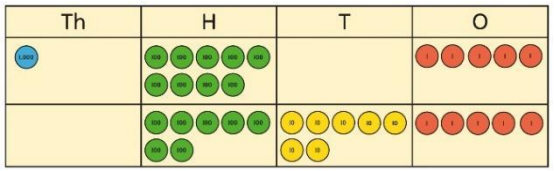
Lower KS2 - Power Maths calculation policy

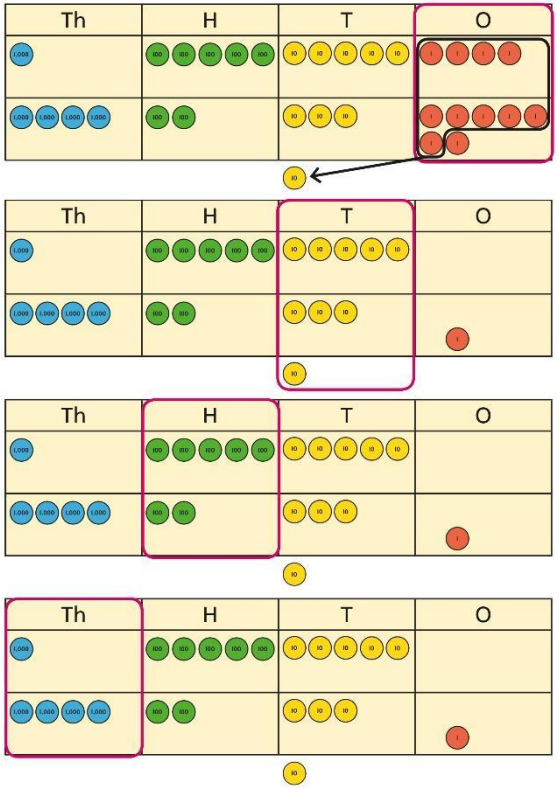
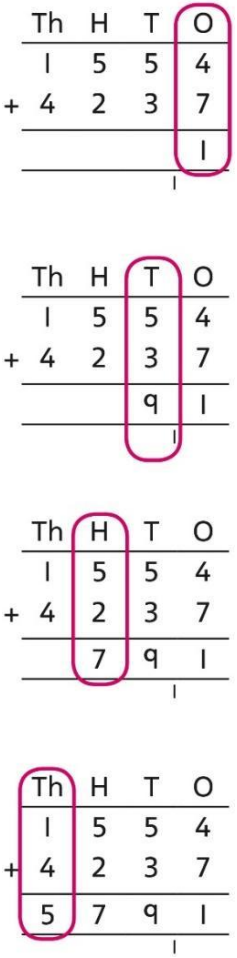
2-digit number divided by 1-digit number, no remainders ***Green text =*** ***encourage the children to orally share their findings/answer through using STEM sentences****	Children explore dividing 2-digit numbers by using place value equipment.  *48 ÷ 2 = ?* *First divide the 10s.*  *Then divide the 1s.* 	Children explore which partitions support particular divisions.  *I need to partition 42 differently to divide by 3.*  42 = 30 + 12 42 ÷ 3 = 14	Children partition a number into 10s and 1s to divide where appropriate.  *60 ÷ 2 = 30* *8 ÷ 2 = 4* *30 + 4 = 34* *68 ÷ 2 = 34* Children partition flexibly to divide where appropriate. *42 ÷ 3 = ?* 42 = 40 + 2 I need to partition 42 differently to divide by 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 concept of remainder. *Make 29 from place value equipment. Share it into 2 equal groups*.	Use place value equipment to understand the concept of remainder in division. *29 ÷ 2 = ?*	Partition to divide, understanding the remainder in context. *67 children try to make 5 equal lines.* 67 = 50 + 17

Lower KS2 - Power Maths calculation policy

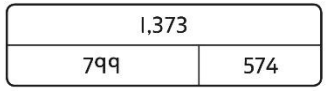
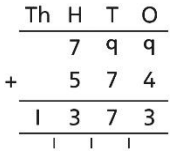
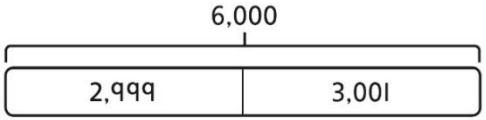
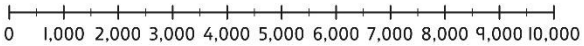
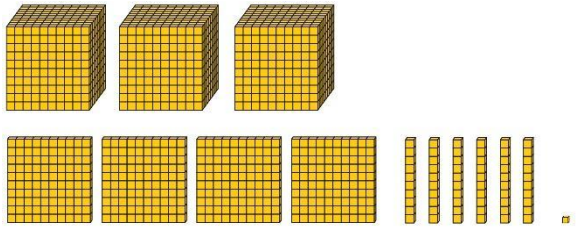
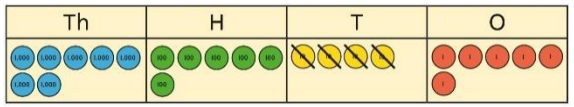
Green text = ***encourage the children to orally share their findings/answer through using STEM sentences****	 There are two groups of 14 and 1 remainder.	 29 ÷ 2 = 14 remainder 1	50 ÷ 5 = 10 17 ÷ 5 = 3 remainder 2 67 ÷ 5 = 13 remainder 2 There are 13 children in each line and 2 children left out.
Year 4			
	Concrete	**Pictorial**	**Abstract**
Year 4 Addition			
Understanding numbers to 10,000 ***Green text =*** ***encourage the children to orally share their findings/answer through using STEM sentences****	Use place value equipment to understand the place value of 4-digit numbers.  4 thousands equal 4,000. 1 thousand is 10 hundreds.	Represent numbers using place value counters once children understand the relationship between 1,000s and 100s.  *2,000 + 500 + 40 + 2 = 2,542*	Understand partitioning of 4-digit numbers, including numbers with digits of 0.  *5,000 + 60 + 8 = 5,068* Understand and read 4-digit numbers on a number line. 
Choosing mental methods	Use unitising and known facts to support mental calculations.	Use unitising and known facts to support mental calculations.	Use unitising and known facts to support mental calculations.

Lower KS2 - Power Maths calculation policy

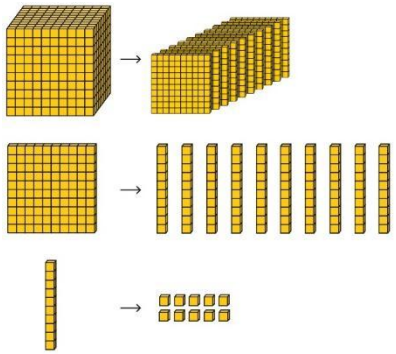
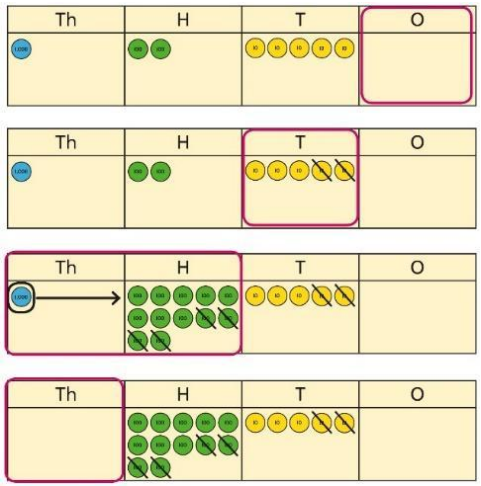
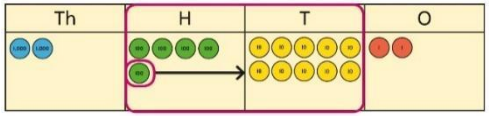
where appropriate ***Green text =*** ***encourage the children to orally share their findings/answer through using STEM sentences****	*Make 1,405 from place value equipment.* *Add 2,000.* *Now add the 1,000s.* 1 thousand + 2 thousands = 3 thousands 1,405 + 2,000 = 3,405	 *I can add the 100s mentally.* *200 + 300 = 500* *So, 4,256 + 300 = 4,556*	*4,256 + 300 = ?* 2 + 3 = 5 200 + 300 = 500 4,256 + 300 = 4,556
Column addition with exchange ***Green text =*** ***encourage the children to orally share their findings/answer through using STEM sentences****	Use place value equipment on a place value grid to organise thinking. Ensure that children understand how the columns relate to place value and what to do if the numbers are not all 4-digit numbers. *Use equipment.to show 1,905 + 775.*  Why have only three columns been used for the second row? Why is the Thousands box empty? Which columns will total 10 or more?	Use place value equipment to model required exchanges.	Use a column method to add, including exchanges.

		 Include examples that exchange in more than one column.	 Include examples that exchange in more than one column.

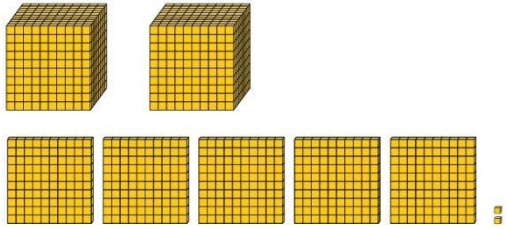
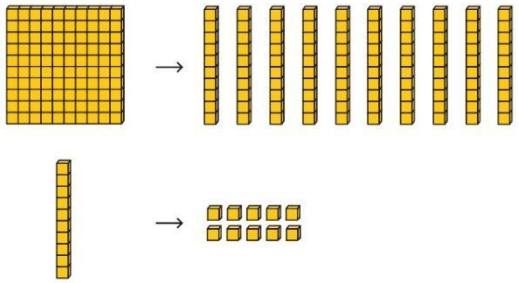
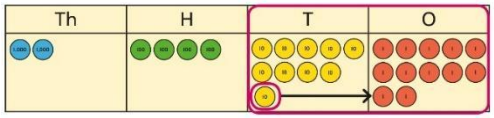
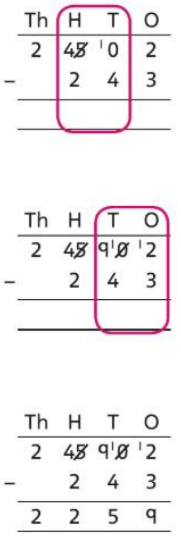
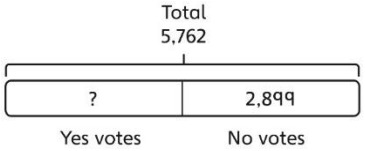
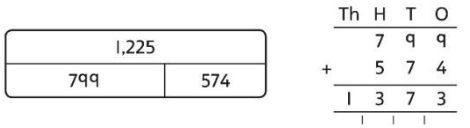
Lower KS2 - Power Maths calculation policy

Representing additions and checking strategies ***Green text =*** ***encourage the children to orally share their findings/answer through using STEM sentences****		Bar models may be used to represent additions in problem 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 to check the reasonableness of an addition.  *912 + 6,149 = ?* I used rounding to work out that the answer should be approximately 1,000 + 6,000 = 7,000.
Year 4 Subtraction			
Choosing mental methods where appropriate ***Green text =*** ***encourage the children to orally share their findings/answer through***	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 methods where appropriate.  *7,646 − 40 = 7,606*	Use knowledge of place value and unitising to subtract mentally where appropriate. *3,501 − 2,000* 3 thousands − 2 thousands = 1 thousand 3,501 − 2,000 = 1,501

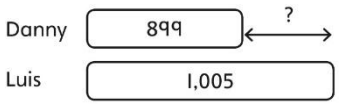
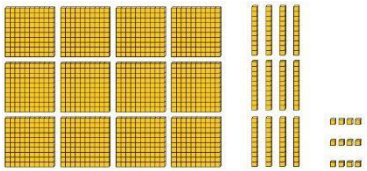
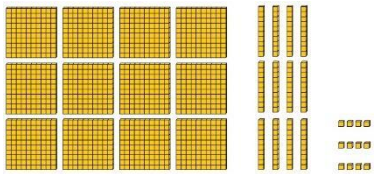
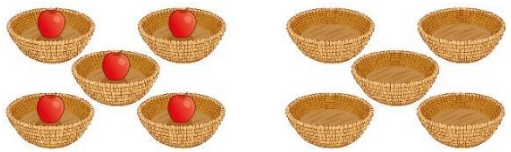
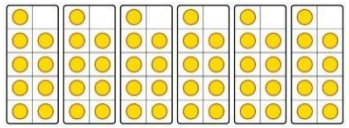
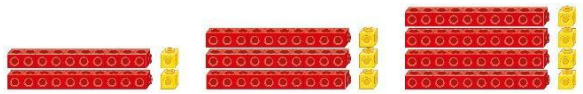
Lower KS2 - Power Maths calculation policy

using STEM sentences*			
Column subtraction with exchange ***Green text =*** ***encourage the children to orally share their findings/answer through using STEM sentences****	Understand why exchange of a 1,000 for 100s, a 100 for 10s, or a 10 for 1s may be necessary.  How do you know that 100 is the same as 10 tens?	Represent place value equipment on a place value grid to subtract, including exchanges where needed. 	Use column subtraction, with understanding of the place value of any exchange required. Th H T O 1 2 5 0 − 4 2 0 0 Th H T O 1 2 5 0 − 4 2 0 3 0 Th H T O ~~1~~ 12 5 0 − 4 2 0 8 3 0 Th H T O ~~1~~ 12 5 0 − 4 2 0 8 3 0
Column subtraction with exchange across more than one column ***Green text =***	Understand why two exchanges may be necessary. *2,502 − 243 = ?*	Make exchanges across more than one column where there is a zero as a place holder. *2,502 − 243 = ?* 	Make exchanges across more than one column where there is a zero as a place holder. *2,502 − 243 = ?*

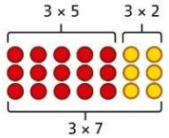
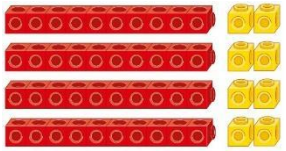
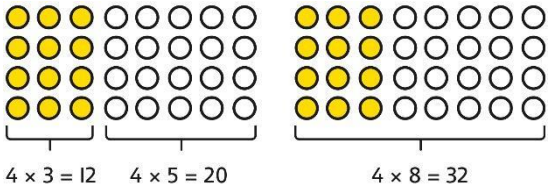
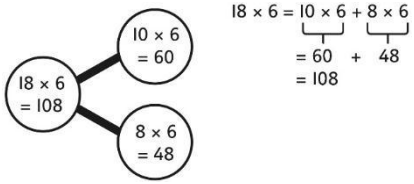
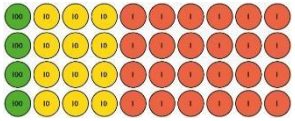
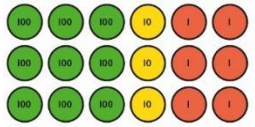
Lower KS2 - Power Maths calculation policy

encourage the children to orally share their findings/answer through using STEM sentences*	 *I need to exchange a 10 for some 1s, but there are not any 10s here.*  So, I need to exchange a 100 for 10 tens first.		
Representing subtractions and checking strategies ***Green text =** ***encourage the children to orally share their findings/answer through***		Use bar models to represent subtractions where a part needs 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.

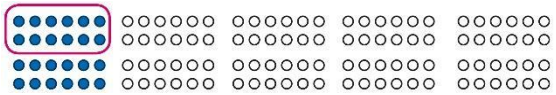
Lower KS2 - Power Maths calculation policy

using STEM sentences*			
Year 4 Multiplication			
Multiplying by multiples of 10 and 100 ***Green text =*** ***encourage the children to orally share their findings/answer through using STEM sentences****	Use unitising and place value equipment to understand how to multiply by multiples of 1, 10 and 100.  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 and 100.  *3 × 4 = 12* *3 × 40 = 120* *3 × 400 = 1,200*	Use known facts and understanding of place value and 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 to 12 × 12 ***Green text =*** ***encourage the children to orally share their findings/answer through using STEM sentences****	Understand the special cases of multiplying by 1 and 0.  *5 × 1 = 5* *5 × 0 = 0*	Represent the relationship between the ×9 table and the ×10 table.  Represent the ×11 table and ×12 tables in relation to the ×10 table.  *2 × 11 = 20 + 2*	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*

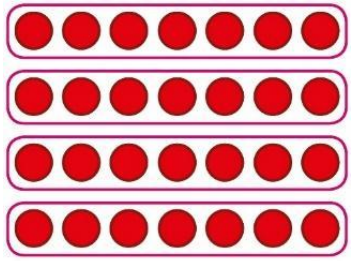
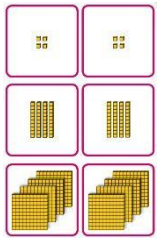
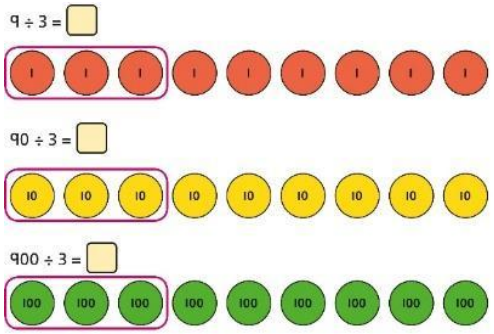
Lower KS2 - Power Maths calculation policy

		3 × 11 = 30 + 3 *4 × 11 = 40 + 4*  *4 × 12 = 40 + 8*	 ×9 table and ×10 table *6 × 10 = 60* *6 × 9 = 60 − 6*
Understanding and using partitioning in multiplication ***Green text =*** ***encourage the children to orally share their findings/answer through using STEM sentences****	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 are related through addition.  *4 × 3 = 12* *4 × 5 = 20* *12 + 20 = 32* *4 × 8 = 32*	Use partitioning to multiply 2-digit numbers by a single digit. *18 × 6 = ?*  *18 × 6 = 10 × 6 + 8 × 6* *= 60 + 48* *= 108*
Column multiplication for 2- and 3-digit numbers multiplied by a single digit ***Green text =***	Use place value equipment to make multiplications. *Make 4 × 136 using equipment.*  *I can work out how many 1s, 10s and 100s.*	Use place value equipment alongside a column method 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

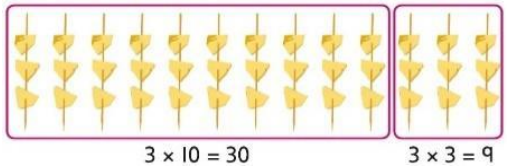
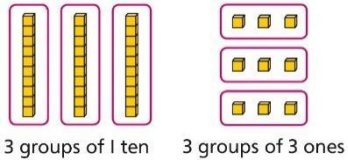
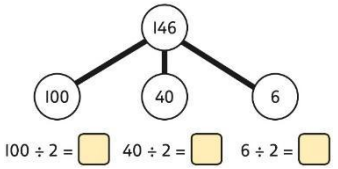
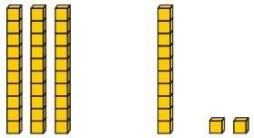
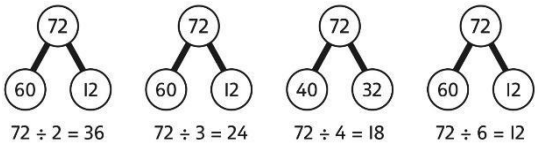
Lower KS2 - Power Maths calculation policy

encourage the children to orally share their findings/answer through using STEM sentences*	*There are 4 × 6 ones… 24 ones* *There are 4 × 3 tens … 12 tens* *There are 4 × 1 hundreds … 4 hundreds* *24 + 120 + 400 = 544*		exchanges are related to place value at each stage of the calculation. $\begin{array}{r} 23 \\ \times\ 5 \\ \hline 15 \\ 100 \\ \hline 115 \end{array}$ $\begin{array}{r} 23 \\ \times\ 5 \\ \hline 115 \\ \hline \end{array}$
Multiplying more than two numbers ***Green text =** ***encourage the children to orally share their findings/answer through using STEM sentences****	Represent situations by multiplying three numbers together.  *Each sheet has 2 × 5 stickers.* *There are 3 sheets.* There are 5 × 2 × 3 stickers in total. $5 \times 2 \times 3 = 30$ $10 \times 3 = 30$	Understand that commutativity can be used to multiply in different orders.  *2 × 6 × 10 = 120* *12 × 10 = 120* *10 × 6 × 2 = 120* *60 × 2 = 120*	Use knowledge of factors to simplify some multiplications. *24 × 5 = 12 × 2 × 5* $12 \times 2 \times 5 =$ $12 \times 10 = 120$ So, 24 × 5 = 120

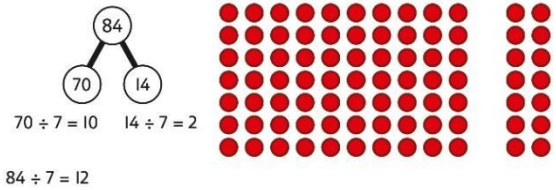
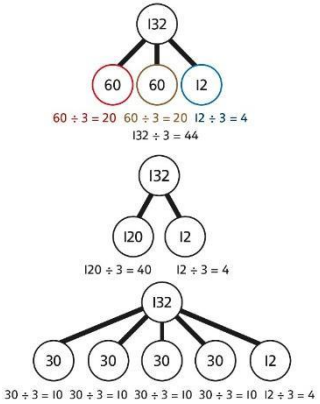
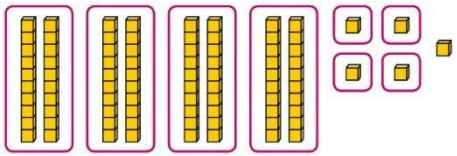
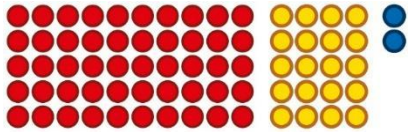
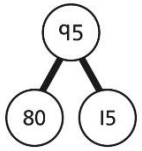
***Lower KS2 - Power Maths* calculation policy**

Year 4 Division			
Understanding the relationship between multiplication and division, including times-tables ***Green text =*** ***encourage the children to orally share their findings/answer through using STEM sentences****	Use objects to explore families of multiplication and division facts.  *4 × 6 = 24* 24 is 6 groups of 4. 24 is 4 groups of 6. 24 divided by 6 is 4. 24 divided by 4 is 6.	Represent divisions using an array.  28 ÷ 7 = 4	Understand families of related multiplication and division facts. *I know that 5 × 7 = 35* *so I know all these facts:* *5 × 7 = 35* *7 × 5 = 35* *35 = 5 × 7* *35 = 7 × 5* *35 ÷ 5 = 7* *35 ÷ 7 = 5* *7 = 35 ÷ 5* *5 = 35 ÷ 7*
Dividing multiples of 10 and 100 by a single digit ***Green text =*** ***encourage the children to orally share their findings/answer through***	Use place value equipment to understand how to use unitising to divide.  *8 ones divided into 2 equal groups* *4 ones in each group*	Represent divisions using place value equipment. 	Use known facts to divide 10s and 100s by a single digit. *15 ÷ 3 = 5* *150 ÷ 3 = 50* *1500 ÷ 3 = 500*

Lower KS2 - Power Maths calculation policy

using STEM sentences*	*8 tens divided into 2 equal groups* *4 tens in each group* *8 hundreds divided into 2 equal groups* *4 hundreds in each group*	9 ÷ 3 = 3 9 tens divided by 3 is 3 tens. 9 hundreds divided by 3 is 3 hundreds.	
Dividing 2-digit and 3-digit numbers by a single digit by partitioning into 100s, 10s and 1s ***Green text =*** ***encourage the children to orally share their findings/answer through using STEM sentences****	Partition into 10s and 1s to divide where appropriate. *39 ÷ 3 = ?*  39 = 30 + 9 30 ÷ 3 = 10 9 ÷ 3 = 3 39 ÷ 3 = 13	Partition into 100s, 10s and 1s using Base 10 equipment to divide where appropriate. *39 ÷ 3 = ?*  39 = 30 + 9 30 ÷ 3 = 10 9 ÷ 3 = 3 39 ÷ 3 = 13	Partition into 100s, 10s and 1s using a part-whole model to divide where appropriate. *142 ÷ 2 = ?*  100 ÷ 2 = 50 40 ÷ 2 = 20 6 ÷ 2 = 3 50 + 20 + 3 = 73 142 ÷ 2 = 73
Dividing 2-digit and 3-digit numbers by a single digit, using flexible partitioning	Use place value equipment to explore why different partitions are needed. *42 ÷ 3 = ?* *I will split it into 30 and 12, so that I can divide by 3 more easily.* 	Represent how to partition flexibly where needed. *84 ÷ 7 = ?* *I will partition into 70 and 14 because I am dividing by 7.*	Make decisions about appropriate partitioning based on the division required.  Understand that different partitions can be used to complete the same division.

Lower KS2 - Power Maths calculation policy

			
Understanding remainders ***Green text =*** ***encourage the children to orally share their findings/answer through using STEM sentences****	Use place value equipment to find remainders. *85 shared into 4 equal groups* *There are 24, and 1 that cannot be shared.* 	Represent the remainder as the part that cannot be shared equally.  *72 ÷ 5 = 14 remainder 2*	Understand how partitioning can reveal remainders of divisions.  80 ÷ 4 = 20 12 ÷ 4 = 3 95 ÷ 4 = 23 remainder 3

