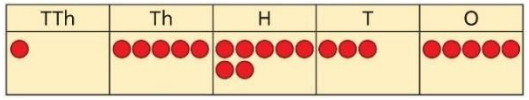
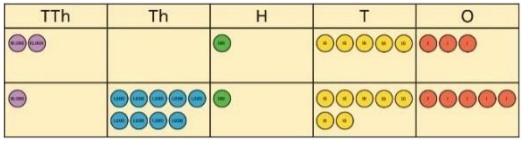
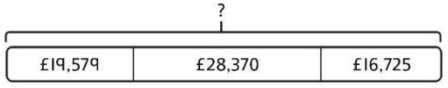
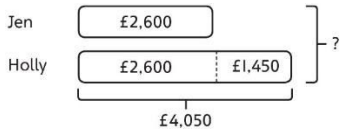
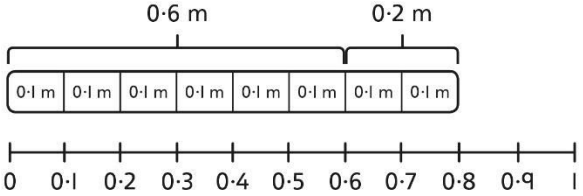
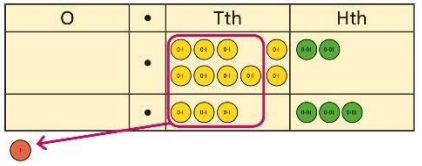
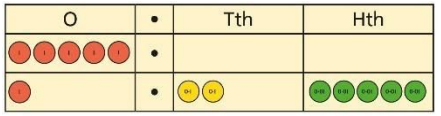
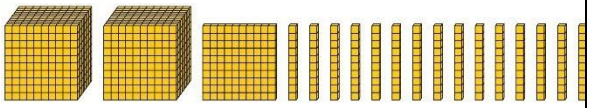
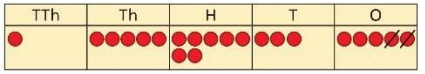
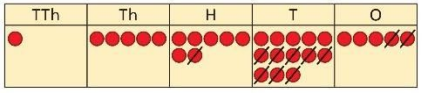
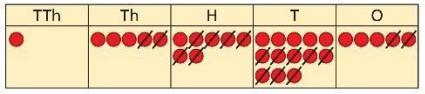
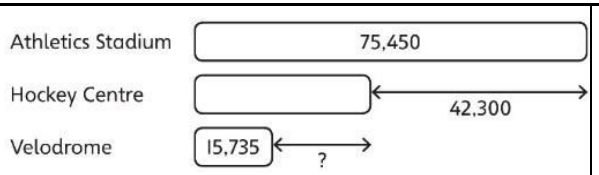
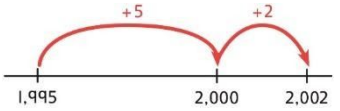
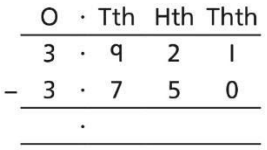
Ottery St Mary Primary School

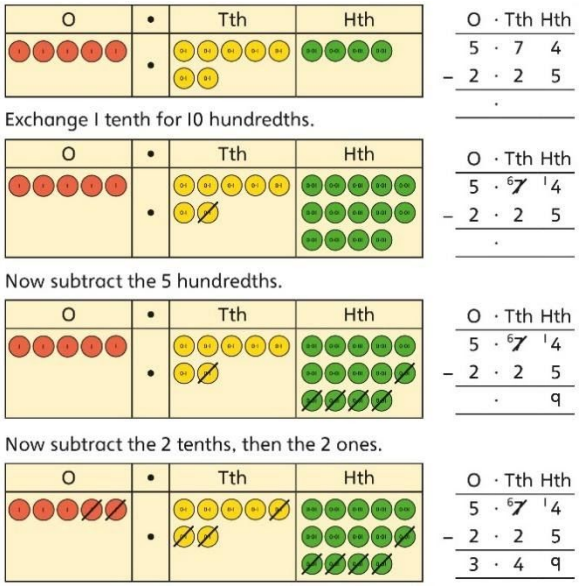
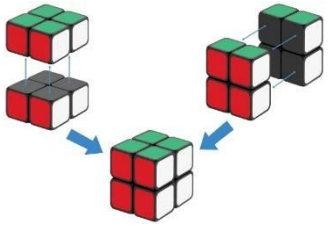
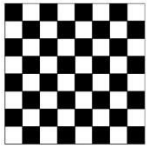
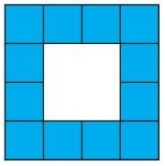
Year 5 Calculation Policy

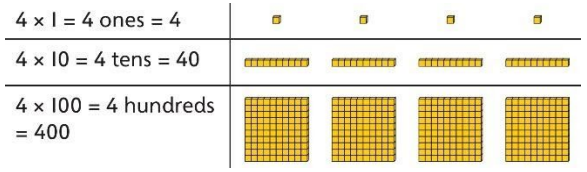
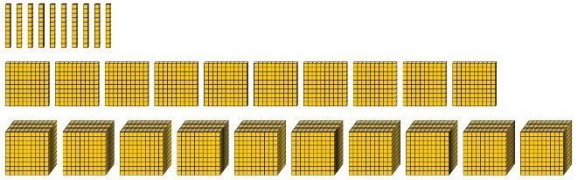
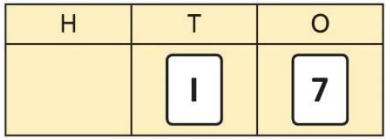
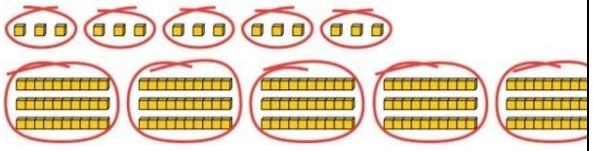
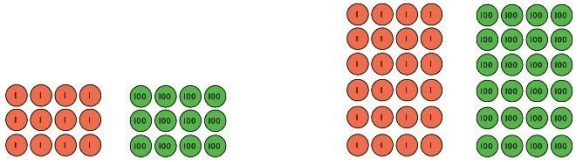
	Concrete	Pictorial	Abstract
Year 5 Addition			
Column addition with whole numbers	Use place value equipment to represent additions. *dd a row of counters onto the place value grid to show 15,735 + 4,012.* 	Represent additions, using place value equipment on a place value grid alongside written methods.  *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
Representing additions		Bar models represent addition of two or more numbers in the context of problem solving. 	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.*

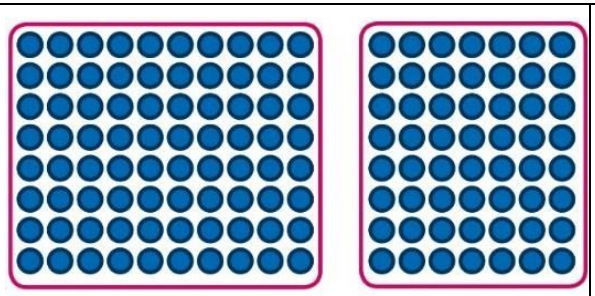
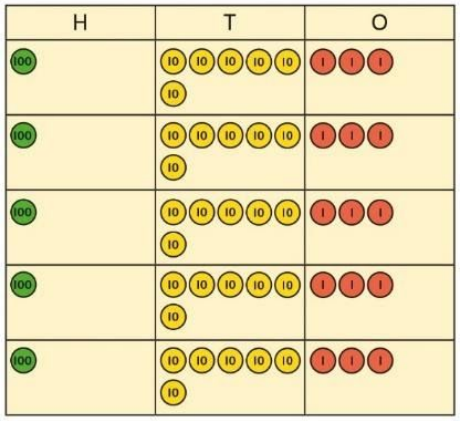
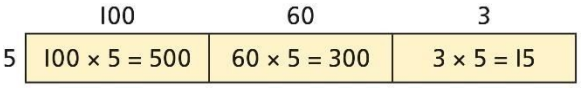
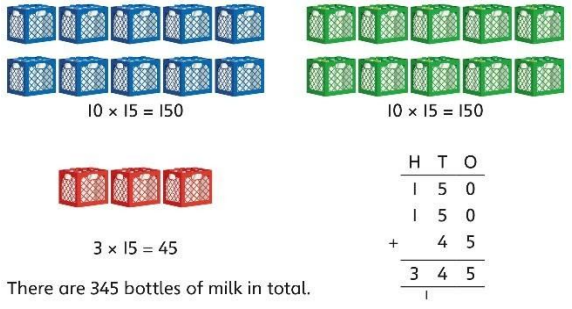
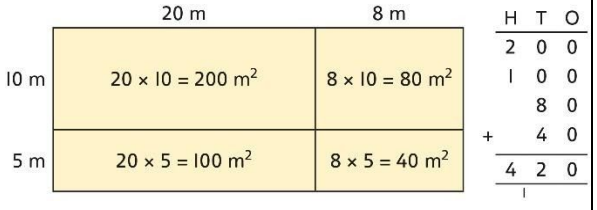
		 Th H T O 2 6 0 0 + 1 4 5 0 4 0 5 0 1 Th H T O 2 6 0 0 + 4 0 5 0 6 6 5 0	
Adding tenths	Link measure with addition of decimals. *wo lengths of fencing are 0·6 m and 0·2 m.* *ow long are they when added together?* 	Use a bar model with a number line to add tenths.  *·6 + 0·2 = 0·8* *tenths + 2 tenths = 8 tenths*	Understand the link with adding fractions. $\frac{6}{10} + \frac{2}{10} = \frac{8}{10}$ *6 tenths + 2 tenths = 8 tenths* *0·6 + 0·2 = 0·8*
Adding decimals using column addition	Use place value equipment to represent additions. *how 0·23 + 0·45 using place value counters.*	Use place value equipment on a place value grid to represent additions. Represent exchange where necessary.  O · Tth Hth 0 · 9 2 + 0 · 3 3 1 · 2 5 1 Include examples where the numbers of decimal places are different.	Add using a column method, ensuring that children understand 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 1

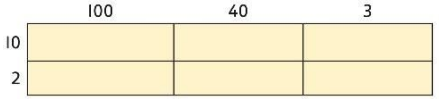
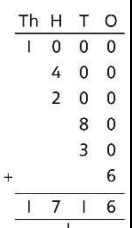
		 O · Tth Hth 5 · 0 0 + 1 · 2 5 6 · 2 5	Include additions where the numbers of decimal places are different. *4 + 0.65 = ?* O · Tth Hth 3 · 4 0 + 0 · 6 5 ·
Year 5 Subtraction			
Column subtraction with whole numbers	Use place value equipment to understand where exchanges are required. *2,250 – 1,070* 	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*  TTh Th H T O 1 5 7 3 5 – 2 5 8 2 3 Now subtract the 10s. Exchange 1 hundred for 10 tens.  TTh Th H T O 1 5 6 7 13 5 – 2 5 8 2 5 3 Subtract the 100s, 1,000s and 10,000s.  TTh Th H T O 1 5 6 7 13 5 – 2 5 8 2 1 3 1 5 3	Use column subtraction methods with exchange where required. TTh Th H T O 5 11 1 9 7 6 2 10 – 1 8 5 3 4 4 3 5 6 3 *2,097 – 18,534 = 43,563*
Checking strategies and representing subtractions		Bar models represent subtractions in problem contexts, including ‘find the difference’.	Children can explain the mistake made when the columns have not been ordered correctly.

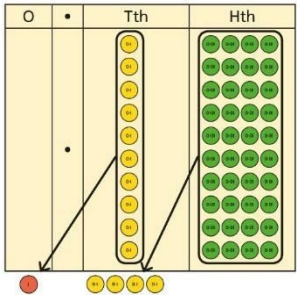
			Use approximation to check calculations. *I calculated 18,000 + 4,000 mentally to check my subtraction.*
Choosing efficient methods			To subtract two large numbers that are close, children find the difference by counting on. *002 − 1,995 = ?*  Use addition to check subtractions. *I calculated 7,546 − 2,355 = 5,191.* *I will check using the inverse.*
Subtracting decimals	Explore complements to a whole number by working in the context of length. *− 0·49 = ?*	Use a place value grid to represent the stages of column subtraction, including exchanges where required. *·74 − 2·25 = ?*	Use column subtraction, with an understanding of place value, including subtracting numbers with different numbers of decimal places. *·921 − 3·75 = ?* 

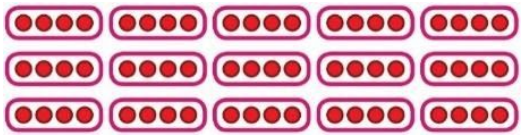
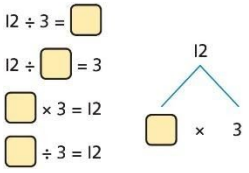
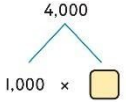
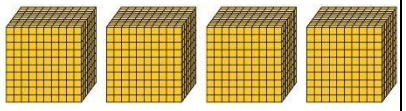
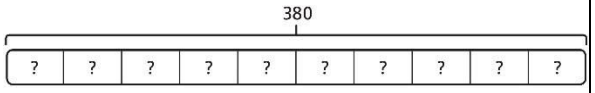
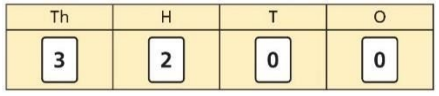
			
Year 5 Multiplication			
Understanding factors	Use cubes or counters to explore the meaning of 'square numbers'. *25 is a square number because it is made from 5 rows of 5.* Use cubes to explore cube numbers. 	Use images to explore examples and non-examples of square numbers.  *8 × 8 = 64* *8^2 = 64* 	Understand the pattern of square numbers in the multiplication tables. Use a multiplication grid to circle each square number. Can children spot a pattern?

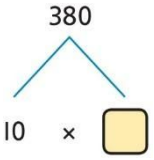
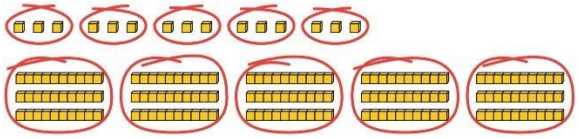
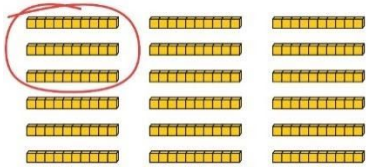
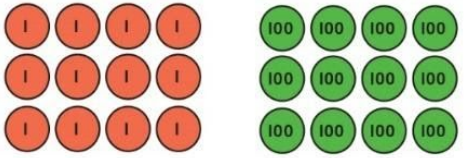
	is a cube number.	*12 is not a square number, because you cannot multiply a whole number by itself to make 12.*	
Multiplying by 10, 100 and 1,000	Use place value equipment to multiply by 10, 100 and 1,000 by unitising. 	Understand the effect of repeated multiplication by 10. 	Understand how exchange relates to the digits when multiplying by 10, 100 and 1,000.  *7 × 10 = 170* *7 × 100 = 17 × 10 × 10 = 1,700* *7 × 1,000 = 17 × 10 × 10 × 10 = 17,000*
Multiplying by multiples of 10, 100 and 1,000	Use place value equipment to explore multiplying by unitising.  *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 15 thousands.*	Use place value equipment to represent how to multiply 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. *× 4 = 20* *× 40 = 200* *× 400 = 2,000* *× 4,000 − 20,000* *000 × 4 = 20,000*
Multiplying up to 4-digit numbers by a single digit	Explore how to use partitioning to multiply efficiently. *8 × 17 = ?*	Represent multiplications using place value equipment and add the 1s, then 10s, then 100s, then 1,000s.	Use an area model and then add the parts.

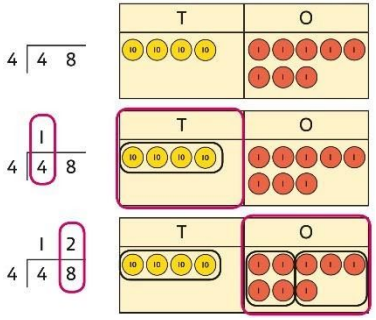
	 8 × 10 = 80 8 × 7 = 56 80 + 56 = 136 *So, 8 × 17 = 136*	 	 Use a column multiplication, including any required exchanges. 1 3 6 × 6 8 1 6 2 3
Multiplying 2-digit numbers by 2-digit numbers	Partition one number into 10s and 1s, then add the parts. *23 × 15 = ?*  *23 × 15 = 345*	Use an area model and add the parts. *28 × 15 = ?*  *28 × 15 = 420*	Use column multiplication, ensuring understanding of place value at each stage. 3 4 × 2 7 2 3 8 34 × 7 3 4 × 2 7 2 3 8 34 × 7 6 8 0 34 × 20

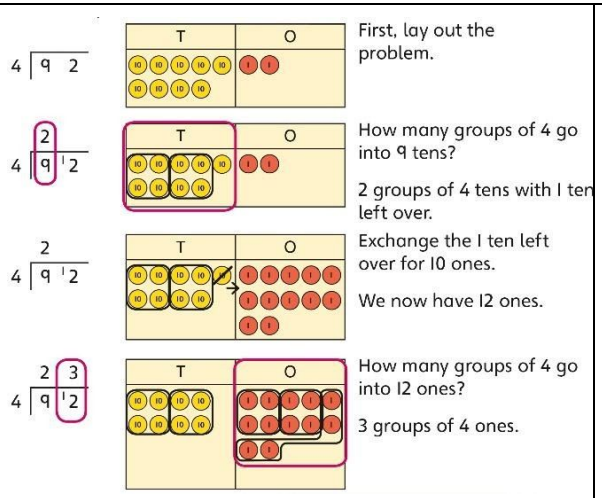
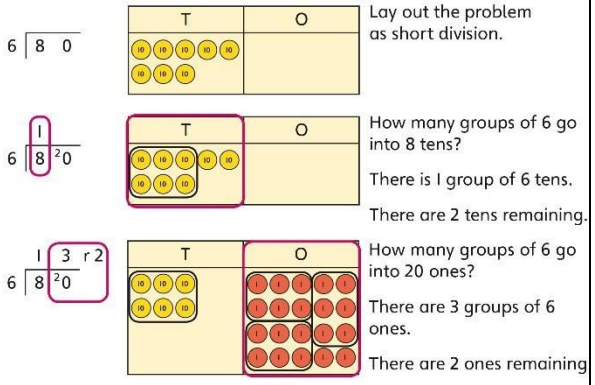
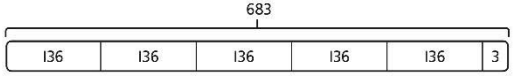
			34 × 27 238 34 × 7 680 34 × 20 918 34 × 27
Multiplying up to 4-digits by 2-digits		Use the area model then add the parts.  143 × 12 = 1,716 There are 1,716 boxes of cereal in total.  *143 × 12 = 1,716*	Use column multiplication, ensuring understanding of place value at each stage. 143 × 2 1430 143 × 10 1716 143 × 12 Progress to include examples that require multiple exchanges as understanding, confidence and fluency build. *1,274 × 32 = ?* *First multiply 1,274 by 2.* 2548 1,274 × 2 *Then multiply 1,274 by 30.* 2548 1,274 × 2 38220 1,274 × 30

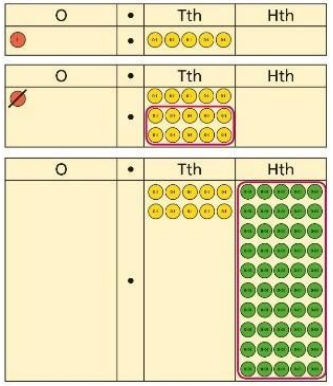
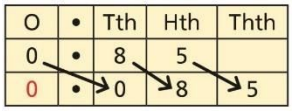
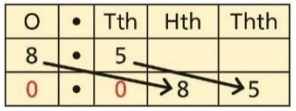
			Finally, find the total. 1 2 7 4 × 3 2 2 5 4 8 (1,274 × 2) 3 8 2 0 (1,274 × 30) 4 0 7 6 8 (1,274 × 32) *1,274 × 32 = 40,768*
Multiplying decimals by 10, 100 and 1,000	Use place value equipment to explore and understand the exchange of 10 tenths, 10 hundredths or 10 thousandths.	Represent multiplication by 10 as exchange on a place value grid.  *1·4 × 10 = 1·4*	Understand how this exchange is represented on a place value chart. 2·5 × 10 = 25 2·5 × 100 = 250 2·5 × 1,000 = 2,500 Th H T O • Tth 2 • 5 2 5 • 2 5 0 • 2 5 0 0 •
Year 5 Division			
Understanding factors and prime numbers	Use equipment to explore the factors of a given number. *24 ÷ 3 = 8* *24 ÷ 8 = 3* *8 and 3 are factors of 24 because they divide 24 exactly.*	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 be divided by only 1 and itself without leaving a remainder.* *I know that 33 is not a prime number as it can be divided by 1, 3, 11 and 33.*

	24 ÷ 5 = 4 remainder 4. *is not a factor of 24 because there is a remainder.*		*I know that 1 is not a prime number, as it has only 1 factor.*
Understanding inverse operations and the link with multiplication, grouping and sharing	Use equipment to group and share and to explore the calculations that are present. *I have 28 counters.* *I made 7 groups of 4. There are 28 in total.* *I have 28 in total. I shared them equally into 7 groups. There are 4 in each group.* *I have 28 in total. I made groups of 4. There are 7 equal groups.*	Represent multiplicative relationships and explore the families of division facts.  *60 ÷ 4 = 15* *60 ÷ 15 = 4*	Represent the different multiplicative relationships to solve problems requiring inverse operations.  Understand missing number problems for division calculations and know how to solve them using inverse operations. *2 ÷ ? = 2* *2 ÷ 2 = ?* *÷ 2 = 22* *÷ 22 = 2*
Dividing whole numbers by 10, 100 and 1,000	Use place value equipment to support unitising for division. *4,000 ÷ 1,000*   *4,000 is 4 thousands.*	Use a bar model to support dividing by unitising. *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.*

	4 × 1,000= 4,000 *So, 4,000 ÷ 1,000 = 4*	 *380 is 38 tens.* *38 × 10 = 380* *10 × 38 = 380* *So, 380 ÷ 10 = 38*	*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 facts and unitising.  *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*	Represent related facts with place value equipment when dividing by unitising.  *180 is 18 tens.* *18 tens divided into groups of 3 tens. There are 6 groups.* *180 ÷ 30 = 6*  *12 ones divided into groups of 4. There are 3 groups.*	Reason from known facts, based on understanding of unitising. Use knowledge of the inverse relationship to check. *,000 ÷ 5 = 600* *,000 ÷ 50 = 60* *,000 ÷ 500 = 6* *× 600 = 3,000* *0 × 60 = 3,000* *00 × 6 = 3,000*

		12 hundreds divided into groups of 4 hundreds. *There are 3 groups.* *1200 ÷ 400 = 3*	
Dividing up to four digits 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 grid alongside short division. The model uses grouping. A sharing model can also be used, although the model would need adapting.  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.	Use short division for up to 4-digit numbers divided by a single digit. $$\begin{array}{r} 0\ 5\ 5\ 6 \\ 7\overline{)\,3\ {}^{3}8\ {}^{3}9\ {}^{4}2} \end{array}$$ *3,892 ÷ 7 = 556* Use multiplication to check. *556 × 7 = ?* *6 × 7 = 42* *50 × 7 = 350* *500 × 7 = 3500* *3,500 + 350 + 42 = 3,892*

			
Understanding remainders	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 2 remaining.*	Use short division and understand remainders as the last remaining 1s. 	In problem solving contexts, represent divisions including remainders with a bar model.  *683 = 136 × 5 + 3* *683 ÷ 5 = 136 r 3*

Dividing decimals by 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 value grid.  *·5 is 1 one and 5 tenths.* *his is equivalent to 10 tenths and 50 hundredths.* *0 tenths divided by 10 is 1 tenth.* *0 hundredths divided by 10 is 5 hundredths.* *·5 divided by 10 is 1 tenth and 5 hundredths.* *·5 ÷ 10 = 0.15*	Understand the movement of digits on a place value grid.  *·85 ÷ 10 = 0·085*  *·5 ÷ 100 = 0·085*
Understanding the relationship between fractions and division	Use sharing to explore the link between fractions and division. *1 whole shared between 3 people.* *Each person receives one-third.* 	Use a bar model and other fraction representations to show the link between fractions and division. $1 \div 3 = \frac{1}{3}$	Use the link between division and fractions to calculate divisions. $5 \div 4 = \frac{5}{4} = 1\frac{1}{4}$ $11 \div 4 = \frac{11}{4} = 2\frac{3}{4}$