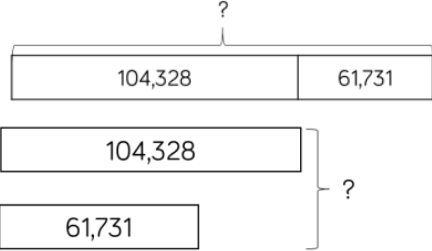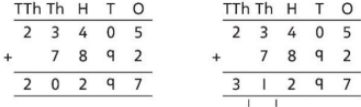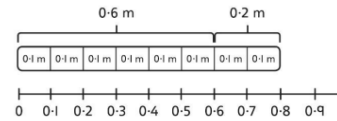| Year 5			
	Concrete	Pictorial	Abstract
Year 5 addition			
Add whole numbers with more than 4 digits, including using formal written methods.	Use place value equipment to represent additions. Add a row of counters onto the place value grid to show 15,735 + 4,012.	Represent additions, using place value equipment on a place value grid alongside written methods. I need to exchange 10 tens for a 100.	Use column addition, including exchanges.
Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy.		Bar models represent addition of two or more numbers in the context of problem solving.	Use approximation to check whether answers are reasonable. I will use 23,000 + 8,000 to check.

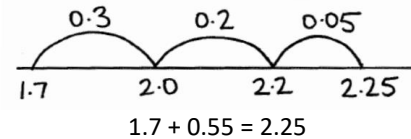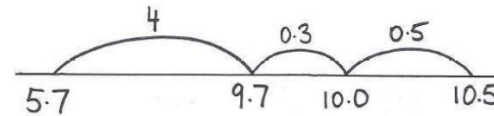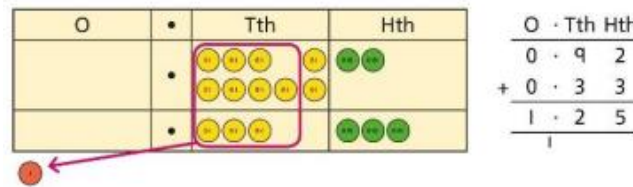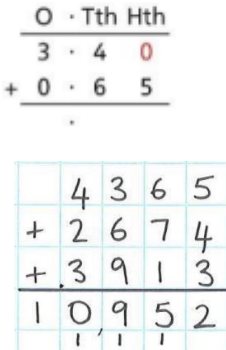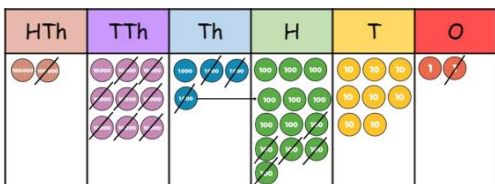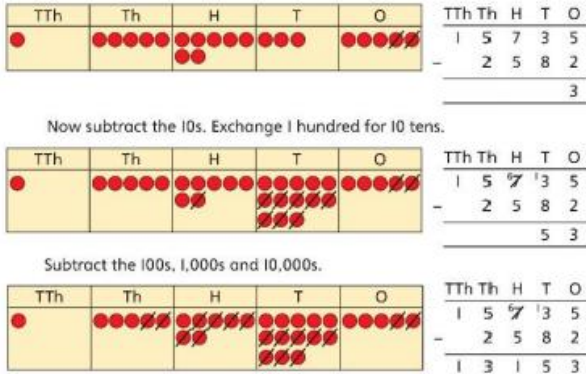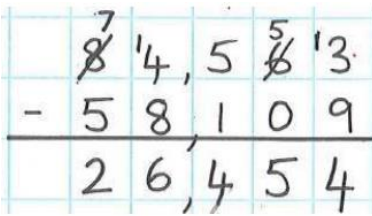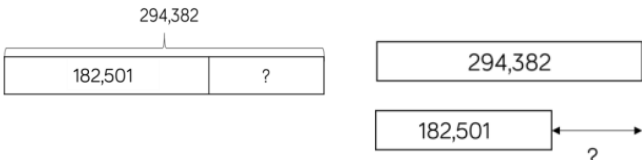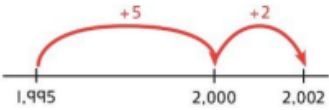|			
Add and subtract numbers mentally with increasingly large numbers.	Children should be able to count on and back in tenths and hundredths. They could use a number line and/or informal jottings to help them.	Use a bar model with a number line to add tenths. $0·6 + 0·2 = 0·8$ 6 tenths + 2 tenths = 8 tenths $1.7 + 0.55 = 2.25$ By using number bonds to bridge through 10: $5.7 + 4.8 = 10.5$	Children should be encouraged to use a variety of different mental maths strategies to solve calculations involving large whole numbers and decimals in their head. Some calculations may be reordered to make them easier to work with. For example: 4.7 + 5.6 - 0.7 becomes 4.7 - 0.7 + 5.6 = 4.0 + 5.6 = 9.6 By using place value to count on or back: 540 + 280 = 540 + 200 + 80 = 820
Solve addition multi-step problems in contexts, deciding which operations and methods to use and why.	Use place value and plain counters on a place value grid when adding decimals with 1,2 and 3 decimal places. $3.65 + 2.41 = 6.06$	Use place value equipment on a place value grid to represent additions. Represent exchange where necessary. Include examples where the numbers of decimal places are different.	Add using a column method, ensuring that children understand the link with place value. Include additions where the numbers of decimal places are different. This includes putting into context when adding money and other measures.

Add more than two numbers.			$3.4 + 0.65 = ?$
Year 5 Subtraction			
Subtract whole numbers with more than 4 digits, including using formal written methods.	Use place value equipment to understand where exchanges are required. $294{,}382 - 182{,}501 = 111{,}881$	Represent the stages of the calculation pictorially using place value equipment on a grid alongside the calculation, including exchanges where required. $15{,}735 - 2{,}582 = 13{,}153$ Now subtract the 10s. Exchange 1 hundred for 10 tens. Subtract the 100s, 1,000s and 10,000s.	Use column subtraction methods with exchange where required. Children should continue to consolidate their understanding of the compact columnar addition and subtraction methods using numbers with more than 4 digits.
Use rounding to check answers to calculations and		Bar models represent subtractions in problem contexts, including 'find the difference'.	At this stage, children should be encouraged to work in the abstract.

determine, in the context of a problem, levels of accuracy.		

Use approximation to check calculations.
I calculated 18,000 + 4,000 mentally to check my subtraction. |
| Choosing efficient methods

Solve subtraction multi-step problems in contexts, deciding which operations and methods to use and why. | | | To subtract two large numbers that are close, children find the difference by counting on.
2,002 – 1,995 = ?

Use addition to check subtractions. I calculated 7,546 – 2,355 = 5,191. I will check using the inverse. |

Subtracting decimals	Use place value and plain counters on a place value grid when subtracting decimals with 1,2 and 3 decimal places. $5.43 - 2.7 = 2.73$	subtraction, including exchanges where required. 5·74 – 2·25 =?	Use a place value grid pictorially to represent the stages of column	Use column subtraction, with an understanding of place value, including subtracting numbers with different numbers of decimal places. 3·921 – 3·75 = ?

Year 5 addition and subtraction vocabulary	addition add, more, and make, sum, total altogether double near double half, halve one more, two more … ten more … one hundred more how many more to make …? how many more is … than …? how much more is …? subtract take away how many are left/left over? how many have gone? one less, two less, ten less … one hundred less how many fewer is … than …? how much less is …? difference between equals is the same as number bonds/pairs/facts missing number tens boundary, hundreds boundary, ones boundary, tenths boundary inverse		

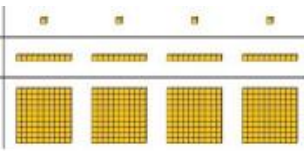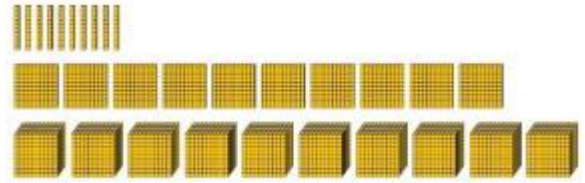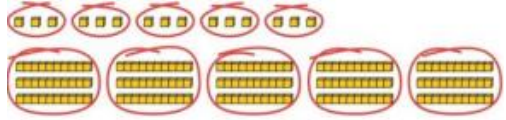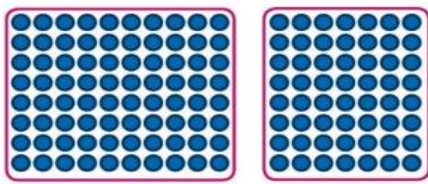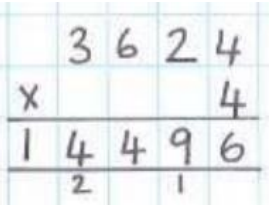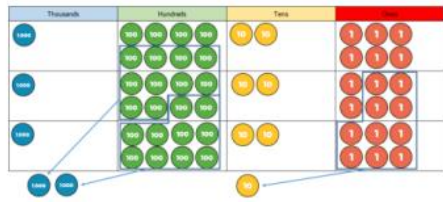| Year 5 Multiplication			
Recognise and use square numbers and cube numbers, and the notation.	Use cubes or counters to explore the meaning of square numbers. 16 is a square number because it is made from 4 rows of 4. Use cubes to explore cube numbers. 4^2 = 4 x 4 = 16 4^3 = 4 x 4 x 4 = 64	Use images to explore examples and nonexamples of square numbers. $8 \times 8 = 64$ $8^2 = 64$ 12 is not a square number, because you cannot multiply a whole number by itself to make 12.	Understand the pattern of square numbers in the multiplication tables. Use a multiplication grid to circle each square number. Can children spot a pattern?

Multiply and divide numbers mentally.			Using their times table knowledge, they may want to partition the numbers in their head first and then multiply each part mentally. They may find it helpful to make jottings as they go.

$$35 \times 6 = 30 \times 6 \quad + \quad 5 \times 6$$
$$= 180 \quad + \quad 30$$
$$= 210$$

Other strategies include:

To multiply by 4: *Double* and then *double* again.

To multiply by 5: *Multiply by 10* and then *halve*.

To multiply by 20: *Multiply by 10* and then *double*. |
| Identify multiples and factors, including finding all factor pairs of a number and common factors of two numbers. | | $6 \times 4 = 24$
Factor   Factor

24
1 — 24
2 — 12
3 — 8
4 — 6

The factors of 24 are 1, 2, 3, 4, 6, 8, 12, 24.

21
1 — 21
3 — 7

14
1 — 14
2 — 7

1 and 7 are common factors of 21 and 14. | Children should be able to use the vocabulary multiple and factor correctly and consistently.

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Factors are numbers you can multiply together to make another number. |
| Know and use the vocabulary of prime numbers, prime factors and composite numbers; establish whether a number up to 100 is a prime number and recall prime numbers up to 19. | Prime factors are factors of a number that are prime numbers. | 2 and 3 are prime factors

18
1 — 2 — 3
18 — 9 — 6 | Prime numbers are often considered the 'basic building blocks' of all other numbers, since all composite numbers can be made up of prime numbers multiplied together.

$12 = 2 \times 2 \times 3$ |

Multiply whole numbers by 10, 100 and 1000	Use place value equipment to multiply by 10, 100 and 1,000 by unitising. 4 × 1 = 4 ones = 4 4 × 10 = 4 tens = 40 4 × 100 = 4 hundreds = 400	Understand the effect of repeated multiplication by 10.	Understand how exchange relates to the digits when multiplying by 10, 100 and 1,000. 17 × 10 = 170 17 × 100 = 17 × 10 × 10 = 1,700 17 × 1,000 = 17 × 10 × 10 × 10 = 17,000
Multiplying by multiples of 10, 100 and 1,000	Use place value equipment to explore multiplying 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. 5 × 4 = 20 5 × 40 = 200 5 × 400 = 2,000 5 × 4,000 − 20,000 5,000 × 4 = 20,000
Multiplying up to 4-digit numbers by a single digit	Explore how to use partitioning to multiply efficiently. 8 × 17 =? 8 × 10 = 80 8 × 7 = 56 80 + 56 = 136 So, 8 x 17 = 136	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. |	100	60	3

5	100 × 5 = 500	60 × 5 = 300	3 × 5 = 15 |
			
			Use a column multiplication, including any required exchanges.
			
			  3 6 2 4
			× 4
			1 4 4 9 6
			   2 1

$$1{,}826 \times 3 = 5{,}478$$

If children are multiplying larger numbers and struggling with their times tables, encourage the use of multiplication grids so children can focus on the use of the written method.

Multiplying 2- digit numbers by 2-digit numbers	Partition one number into 10s and 1s, then add the parts. $22 \times 31 = 682$	It may be appropriate to use the grid method when children first launch into the process of multiplying a number by a two-digit number.	Use column multiplication, ensuring understanding of place value at each stage. The first step is to solve 76 x 8 using the short multiplication method (see Year 4). The 5 in 58 is 50, or 5 lots of 10. So, instead of multiplying by 50, we can multiply by 10 first and then 5. To multiply by 10, we move our digits one place to the left; this can be done by putting a 0 in the ones column. Short multiplication can then be used to multiply the 76 by 5.
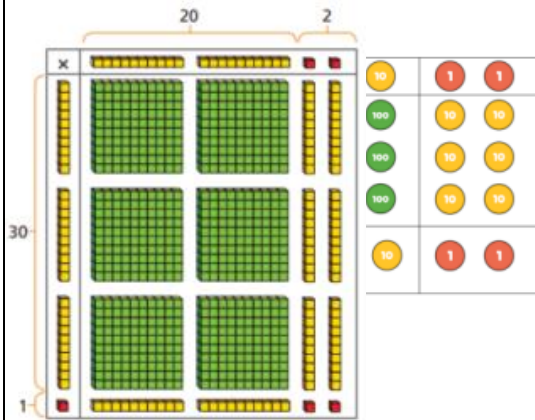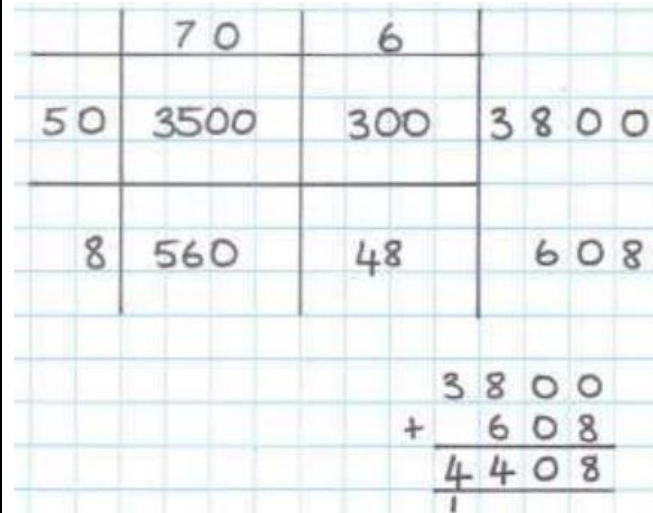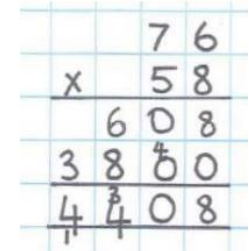
Multiplying up to 4-digits by 2-digits	Children can continue to use the area model when multiplying larger numbers by 2 digits. Place value counters become more efficient to use but Base 10 can be used to highlight the size of numbers. $234 \times 32 = 7{,}488$	Use the area model then add the parts. 	×	200	30	4
30	6,000	900	120
2	400	60	8	 	Th	H	T	O
	2	3	4
×		3	2
	4	6	8
$_1 7$	$_1 0$	2	0
7	4	8	8 | Encourage children to move towards the formal written method, seeing the links with the grid method.	Use column multiplication, ensuring understanding of place value at each stage. | TTh	Th	H	T	O
---	---	---	---	---
	2	7	3	9
×			2	8
2	1	9	1	2
2	5	3	7	
5	4	7	8	0
1		1		
7	6	6	9	2	
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. $0.14 \times 10 = 1.4$	understand how this exchange is represented on a place value chart. $2.5 \times 10 = 25$ $2.5 \times 100 = 250$ $2.5 \times 1{,}000 = 2{,}500$
Year 5 Division			
Understanding factors and prime numbers	Use equipment to explore the factors of a given number.	Understand that prime numbers are numbers with exactly two factors. $13 \div 1 = 13$ $13 \div 2 = 6 \, r \, 1$ $13 \div 4 = 4 \, r \, 1$	Understand how to recognise prime and composite numbers. I know that 31 is a prime number because it can be divided by only
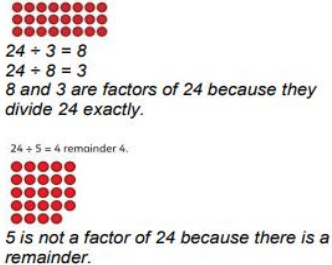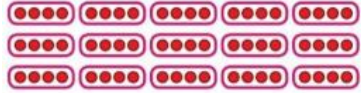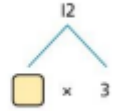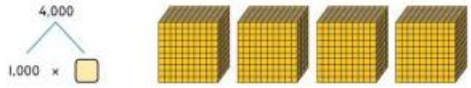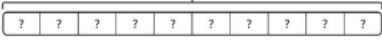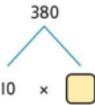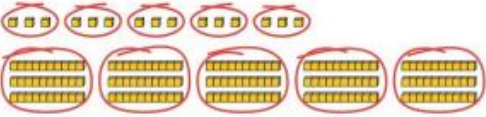
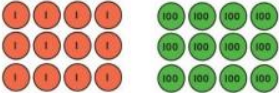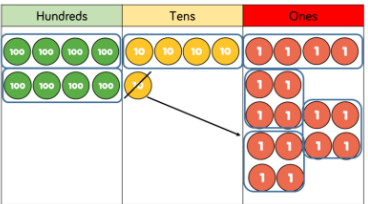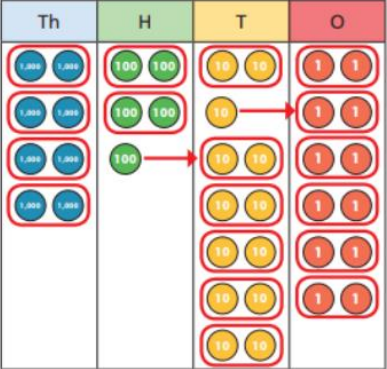|			
	24 ÷ 3 = 8 24 ÷ 8 = 3 8 and 3 are factors of 24 because they divide 24 exactly. 24 ÷ 5 = 4 remainder 4. 5 is not a factor of 24 because there is a remainder.	1 and 13 are the only factors of 13. 13 is a prime number	1 and itself without leaving a remainder. I know that 33 is not a prime number as it can be divided by 1, 3, 11 and 33. 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. 12 ÷ 3 = ☐ 12 ÷ ☐ = 3 ☐ × 3 = 12 ☐ × 3 ☐ ÷ 3 = 12 Understand missing number problems for division calculations and know how to solve them using inverse operations. 22 ÷ ? = 2 22 ÷ 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. ptc 4,000 1,000 × ☐	Use a bar model to support dividing by unitising. 380 ÷ 10 = 38 380 10 × ☐	380 is 38 tens. 38 × 10 = 380 10 × 38 = 380 So, 380 ÷ 10 = 38	Understand how and why the digits change on a place value grid when dividing by 10, 100 or 1,000. 3,200 ÷ 100 = ? 3,200 is 3 thousands and 2 hundreds. 200 ÷ 100 = 2 3,000 ÷ 100 = 30 3,200 ÷ 100 = 32 So, the

	4,000 is 4 thousands. 4 × 1,000= 4,000 So, 4,000 ÷ 1,000 = 4		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. 18 tens divided into groups of 3 tens. There are 6 groups. 180 is 18 tens. 180 ÷ 30 = 6 12 ones divided into groups of 4. There are 3 groups. 12 hundreds divided into groups of 4 hundreds. There are 3 groups. 1200 ÷ 400 = 3	Reason from known facts. Use knowledge of the inverse relationship to check. 3,000 ÷ 5 = 600 3,000 ÷ 50 = 60 3,000 ÷ 500 = 6 5 × 600 = 3,000 50 × 60 = 3,000 500 × 6 = 3,000
Dividing up to four digits by a single digit using short division	Explore grouping using place value equipment. 856 ÷ 4 =214 There are 2 groups of 4 hundreds. There is 1 group of 4 tens. There are 4 groups of 4 ones. 	Use place value equipment on a place value grid alongside short division. Lay out the problem as a short division.	Use short division for up to 4-digit numbers divided by a single digit. $$7\overline{)3\,{}^38\,{}^39\,{}^42} = 0556$$ 3,892 ÷ 7 = 556 Use multiplication to check. 556 × 7 =? 6 × 7 = 42 50 × 7 = 350
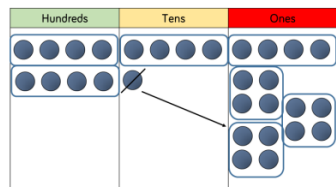
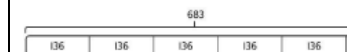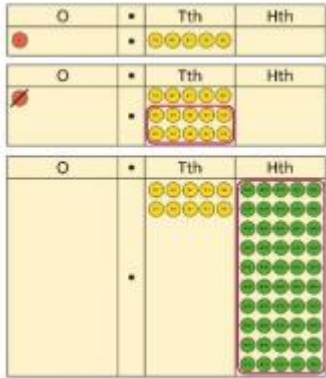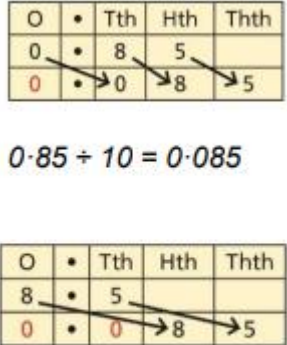|			500 × 7 = 3500 3,500 + 350 + 42 = 3,892
	  $856 \div 4 = 214$		
Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context.	understand remainders using concrete versions of a problem. *80 cakes divided 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* Children will also have to express the remainder in a variety of ways, according to the context of the question. 943 ÷ 7 = 134 and 6/7s Some remainders can be represented as a decimal instead: 906 ÷ 8 = 113 and 2/8s = 113.25

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. 1·5 is 1 one and 5 tenths. This is equivalent to 10 tenths and 50 hundredths. 10 tenths divided by 10 is 1 tenth. 50 hundredths divided by 10 is 5 hundredths. 1·5 divided by 10 is 1 tenth and 5 hundredths. $1{\cdot}5 \div 10 = 0.15$	Understand the movement of digits on a place value grid. $0{\cdot}85 \div 10 = 0{\cdot}085$ $8{\cdot}5 \div 100 = 0{\cdot}085$
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. $5 \div 4 = \frac{5}{4} = 1\frac{1}{4}$ $11 \div 4 = \frac{11}{4} = 2\frac{3}{4}$
Year 5 multiplication and division vocabulary	multiplication multiply multiplied by multiple, factor groups of times product once, twice, three times … ten times repeated addition division dividing, divide, divided by, divided into left, left over, remainder grouping sharing, share, share equally one each, two each, three each … ten each group in pairs, threes … tens equal groups of doubling halving array row, column number patterns multiplication table multiplication fact, division fact, inverse square, squared cube, cubed			