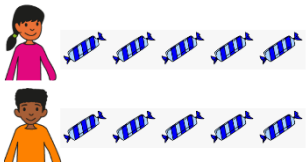
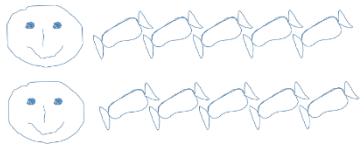
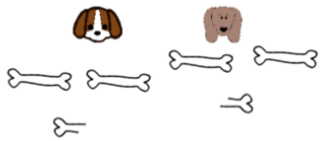
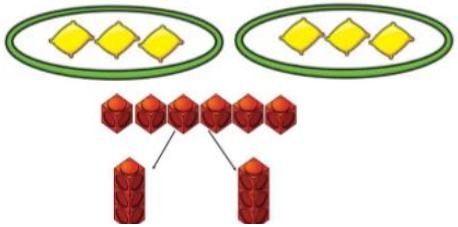
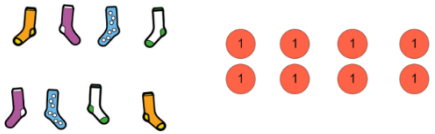
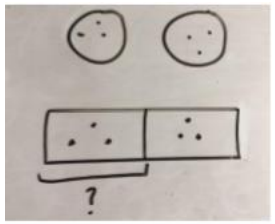
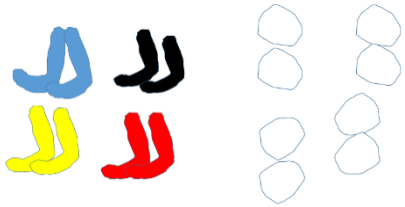
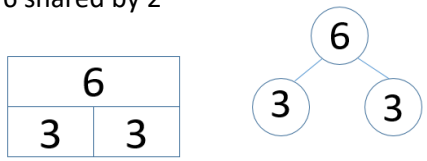
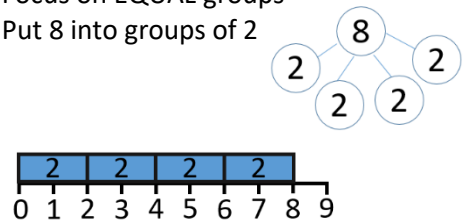
Progression in Calculations - Division

Links to access online manipulative resources
https://whiterosemaths.com/resources/classroom-resources/interactive-whiteboard-resources/
https://nrich.maths.org/8938
https://www.splashlearn.com/division-games
https://www.topmarks.co.uk/maths-games/hit-the-button
https://www.topmarks.co.uk/Interactive.aspx?cat=13
https://www.coolmath4kids.com/manipulatives/base-ten-blocks
https://toytheater.com/marble-jar/
https://mathsbot.com/manipulatives/placeValueCounters
https://mathsbot.com/manipulatives/bar
https://www.nctm.org/Classroom-Resources/Illuminations/Interactives/Ten-Frame/
https://www.didax.com/apps/number-line/
https://www.teacherled.com/all-interactive-whiteboard-resources/categories/multiplication-resources/
https://www.topmarks.co.uk/Interactive.aspx?cat=13

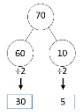
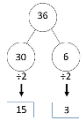
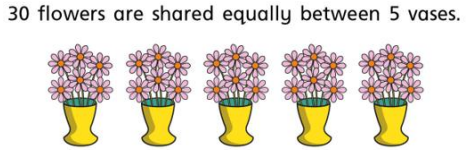
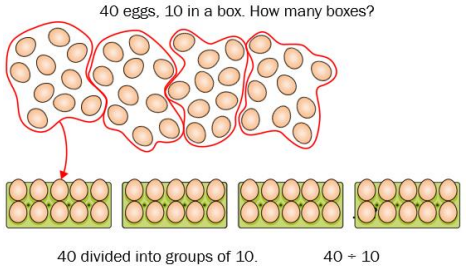
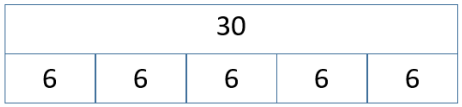
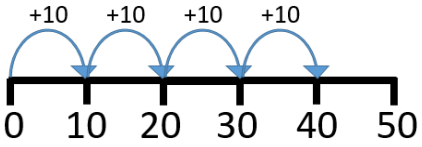
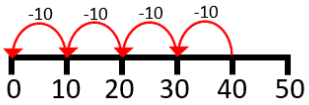
EYFS Division

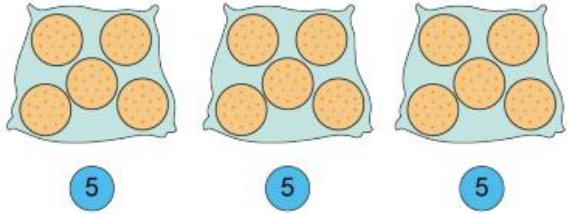
	Mental Strategies	Concrete	Pictorial	Abstract	Vocabulary	Models, Images and resources
EYFS	The ELG states that children solve problems, including doubling, halving and sharing. Children need to see and hear representations of division as both grouping and sharing. Division can be introduced through halving. Count in twos; fives; tens both aloud and with objects.	**Grouping Model** *Rose has 6 socks. She grouped them into pairs – how many pairs did she make?* **Sharing Model** *I have 10 sweets. I want to share them with my friend. How many will we have each?* 	**Grouping Model** Children to draw the concrete resources they are using. **Sharing Model** Children to draw the concrete resources they are using. 	**Grouping Model** Write the number sentence **Sharing Model** 	Share Sharing grouping Equal groups Left over Half halving	100 square Number lines Number tracks Bead strings (for children) Bead bar Tens Frame Numicon Place Value Disks Cuisenaire Base tens and ones
		Although not explicit in the Development Matters document, the sharing model is a useful way of introducing young children to simple halves as fractions. Setting the problems in real life context and solving them with concrete apparatus will support children's understanding. "I have got 5 bones to share between my two dogs. How many bones will they get each?" 				

Year One Division

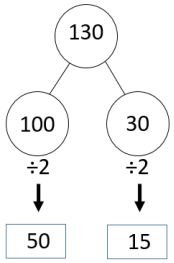
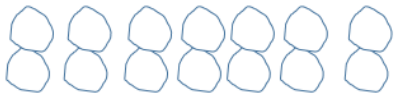
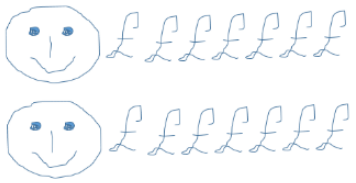
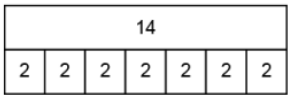
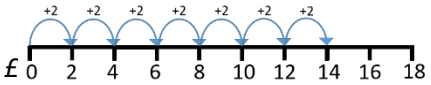
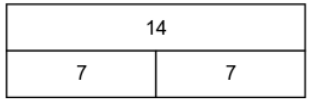
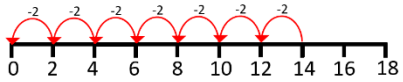
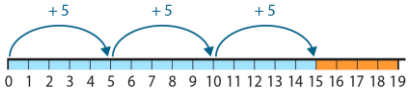
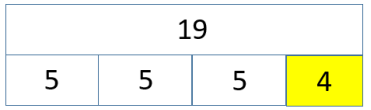
	Mental Strategies	Concrete	Pictorial	Abstract	Vocabulary	Models, Images and resources
Year 1	Share objects into equal groups and count how many in each group and consider 'left over'. Count on from and back to zero in ones, twos, fives or tens Make connections between arrays, number patterns, and counting in twos, fives and tens.	**Sharing using a range of objects.** Focus on EQUAL groups 6 shared by 2  **Put small numbers into groups** Focus on EQUAL groups Put 8 into groups of 2 	**Sharing using a range of objects.** Focus on EQUAL groups 6 shared by 2  **Put small numbers into groups** Focus on EQUAL groups Put 8 into groups of 2 	**Sharing using a range of objects.** Focus on EQUAL groups 6 shared by 2  **Put small numbers into groups** Focus on EQUAL groups Put 8 into groups of 2 	Share Sharing grouping Equal groups Left over Half halving	100 square Number lines Number tracks Bead strings (for children) Bead bar Tens Frame Numicon Place Value Disks Cuisenaire Base tens and ones
		Practical problem-solving activities involving equal sets or groups. Begin to understand division through grouping and sharing and halving small quantities *Can you cut the cake in half? How many pieces are there? How many cakes are there in the box? Take half of them out.* Solve simple one-step problems using concrete objects, pictorial representations and finding simple fractions of objects, numbers and quantities. with the support of the teacher				

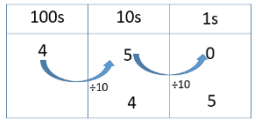
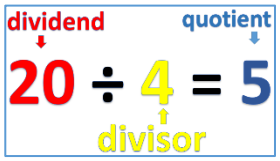
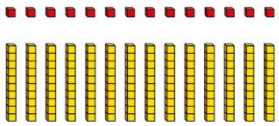
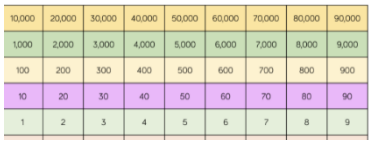
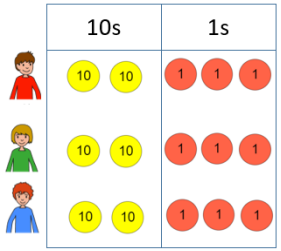
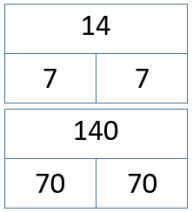
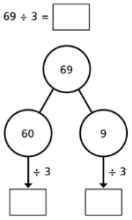
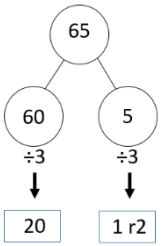
Year Two Division

	Mental Strategies	Concrete	Pictorial	Abstract	Vocabulary	Models, Images and resources
Year 2	Practise to become fluent in recall and use of multiplication and division facts for the 2, 5 and 10 multiplication tables, Halve any multiple of 10 up to 100,  Find half of even numbers to 40  Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot	**Sharing using a range of objects.** Please see the guidance for Year 1 Here is one example  Cubes and other manipulatives can be used also **Grouping using times tables 2 5 10**  	**Sharing using a range of objects.** Please see the guidance for Year 1 Here is one example – hand drawn **Grouping using times tables 2 5 10** Children can draw the groups of 10	**Sharing using a range of objects.** Please see the guidance for Year 1  30 ÷ 5 = 6 **Grouping using times tables 2 5 10** See bar model or part whole model above  40 ÷ 10 = 4  	Divide Share equally, one each, two each…, Grouping equal groups, how many lots of, groups of… half of halved symbol ÷	100 square Number lines Number tracks Bead strings (for children) Bead bar Tens Frame Numicon Place Value Disks Cuisenaire Base hundreds tens and ones Arrow Cards
		Pupils need to be able to represent problems where the total quantity and group size is known, using multiplication equations with missing factors. For example, “There are 15 biscuits. If I put them into bags of 5, how many bags will I need?’’ can be represented by				

	Introduce the symbol for division ÷	the following equation: …..× 5 = 15 Pupils can use skip counting or their emerging 2, 5 and 10 multiplication table fluency tocalculate the missing factor.  Begin to use other x tables and division facts to perform written calculation. Relate to fractions and measures eg. 40÷2 =20, 20 is a half of 40 Check calculations using the inverse relationship between x and ÷		

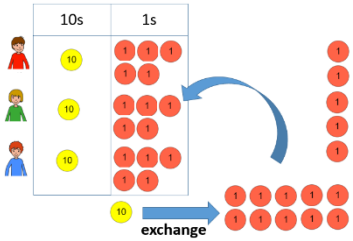
Year 3 Division

	Mental Strategies	Concrete	Pictorial	Abstract	Vocabulary	Models, Images and resources
Year 3	Halve any multiple of 10 up to 200, e.g. halve 170  Recall and use division facts for the 3, 4 and 8 x tables, use halving to derive division by 2, 4 and 8 Calculate and write mathematical statements for division using related x tables facts, including for TU ÷ U mentally Develop efficient mental methods using facts e.g. 6 ÷ 3 = 2 and 2 = 6 ÷ 3 to derive related facts 60 ÷ 3 = 20 and 20 = 60 ÷ 3	**Apply division facts for 2, 4, 8, 5, 10 and 3 in both contexts of grouping and sharing** *I need 14 ping-pong balls. There are 2 ping-pong balls in a pack. How many packs do I need?* *£14 is shared between 2 children. How much money does each child get?* **Division with remainders** *19 cars shared between 5 children* 	**Apply division facts for 2, 4, 8, 5, 10 and 3 in both contexts of grouping and sharing** *I need 14 ping-pong balls. There are 2 ping-pong balls in a pack. How many packs do I need?*  *£14 is shared between 2 children. How much money does each child get?*  **Division with remainders** *19 cars shared between 5 children* 	**Apply division facts for 2, 4, 8, 5, 10 and 3 in both contexts of grouping and sharing** *I need 14 ping-pong balls…* 14 ÷ 2 = 7   *How much money does each child get?* 14 ÷ 2 = 7   **Division with remainders** *19 cars shared between 5 children*   19 ÷ 5 = 3r4	Divide Share equally, one each, two each…, Grouping equal groups, how many lots of, groups of… half of halved symbol ÷ Remainder Left over Repeated subtraction dividend divisor	100 square Number lines Number tracks Bead strings (for children) Bead bar Tens Frame Numicon Place Value Disks Cuisenaire Base hundreds tens and ones Arrow Cards Gattegno chart Place Value Grid

	Divide TU and HTU numbers by 10, understand the effect of ÷10 e.g. 700 ÷ 10,  Also use the Gattegno Chart to help Identify remainders when dividing by 2, 5 or 10 Know the vocabulary for division equations see below  	**Related Calculations**  14 ÷ 2 = 7 140 ÷ 2 = 70 Also use the Gattegno Chart to help  **2 digit divided by 1 digit no exchange or remainders** *£69 is shared between 3 children. How much money does each child get?*  **2 digit divided by 1 digit with no exchange but remainders** *£65 is shared between 3 children. How much money does each child get?*	**Related Calculations** 4 x 30 = 120 – draw it **2 2 digit divided by 1 digit no exchange or remainders** *£69 is shared between 3 children. How much money does each child get?* **2 digit divided by 1 digit with no exchange but remainders** *£65 is shared between 3 children. How much money does each child get?*	**Related Calculations** 14 ÷ 2 = 7 140 ÷ 2 = 70  **2 digit divided by 1 digit no exchange or remainders** *£69 is shared between 3 …*  69 ÷ 3 = 33 Can also count back on number lines (repeated subtraction) or count on. See above. **2 digit divided by 1 digit with no exchange but remainders** *£65 is shared between 3…* 65 ÷ 3 = 23 r 2  	quotient a tenth of the size	

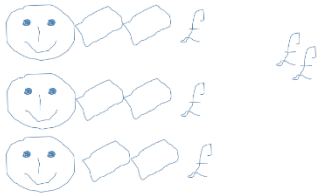
2 digit divided by 1 digit with exchange but no remainders

£45 is shared between 3 children. How much money does each child get?



2 digit divided by 1 digit with exchange with remainders

Please see above worked examples – exactly the same principle, with a remainder and the need for exchanging tens for ones.



2 digit divided by 1 digit with exchange but no remainders

£45 is shared between 3 children. How much money does each child get?

Can be drawn – please see above example

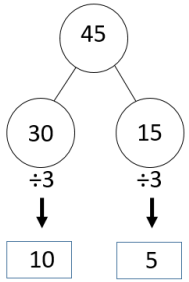
2 digit divided by 1 digit with exchange with remainders

Please see above worked examples – exactly the same principle, with a remainder and the need for exchanging tens for ones.

2 digit divided by 1 digit with exchange but no remainders

£45 is shared between 3…

45 ÷ 3 = 15



2 digit divided by 1 digit with exchange with remainders

Please see above worked examples – exactly the same principle, with a remainder and the need for exchanging tens for ones.

Solve problems in context deciding which method to use and why, including

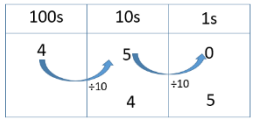
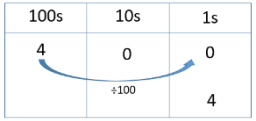
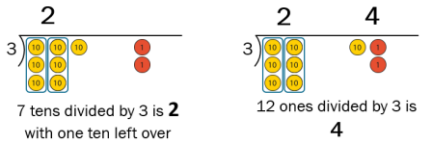
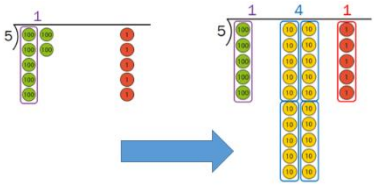
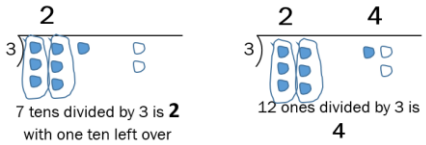
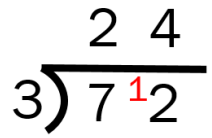
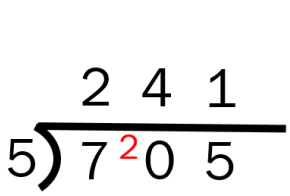
missing number problems

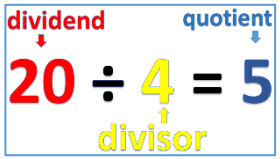
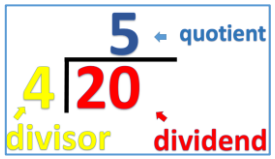
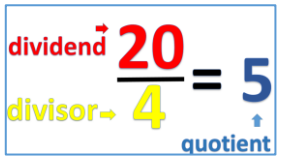
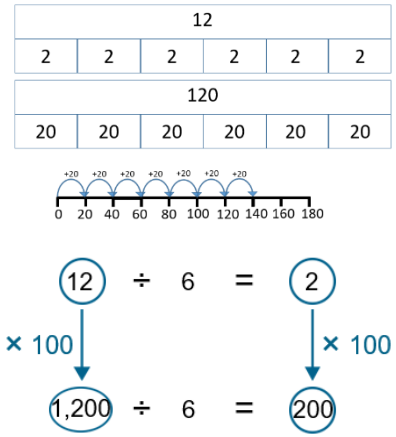
measuring and money context

correspondence problems in which m objects are connected to n objects eg 12 sweets shared equally between 4 children; 40 cakes shared equally between 8.

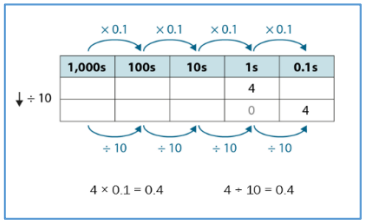
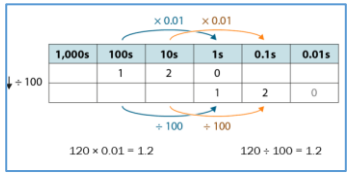
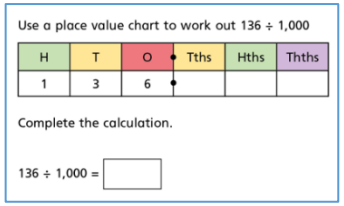
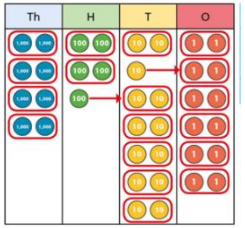
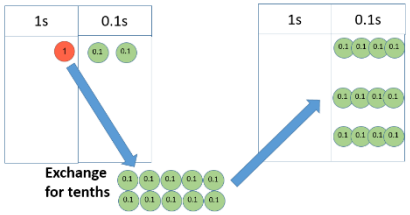
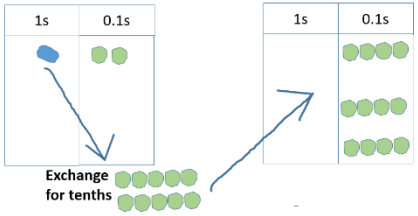
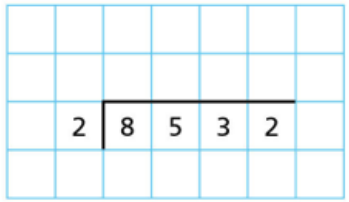
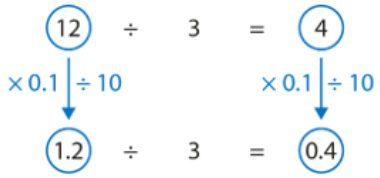
		Use practical methods and jottings, including remainders		

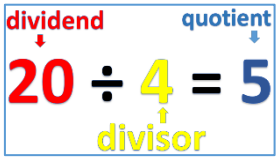
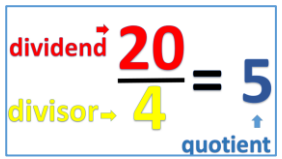
Year 4 Division

	Mental Strategies	Concrete	Pictorial	Abstract	Vocabulary	Models, Images and resources
Year 4	Practise and extend mental methods to three-digit numbers to derive facts e.g. 200 × 3 = 600 into 600 ÷ 3 = 200 Divide multiples of 10 up to 1000 by 10 E.g. 120 ÷ 10  Divide multiples of 100 up to 10, 000 by 100 e.g. 600 ÷ 100 or 2800 ÷ 100  Divide two-digit numbers by 4 or 8, e.g. 296 ÷ 8 Identify remainders when dividing by 1 to 12 Find halves of multiples of 10, even numbers to 200 and three-digit multiples of 10 to 500 e.g. 760 ÷ 2	**Apply division facts for all multiplication tables in contexts of grouping and sharing – including remainders** See Y3 guidance - same principle **2 digit divided by 1 digit all 4 possibilities – moving to short division layout** For all 4 informal possibilities – please see Year 3 examples as it is the same principle. £72 shared between three using short division layout  **3 digit divided by 1 digit all 4 possibilities – moving to short division layout** £705 shared between three using short division layout  	**Apply division facts for all multiplication tables in contexts of grouping and sharing – including remainders** See Y3 guidance - same principle **2 digit divided by 1 digit all 4 possibilities – moving to short division layout** For all 4 informal possibilities – please see Year 3 examples as it is the same principle. £72 shared between three using short division layout  **3 digit divided by 1 digit all 4 possibilities – moving to short division layout** £705 shared between three using short division layout **Can be drawn just like the worked example above**	**Apply division facts for all multiplication tables in contexts of grouping and sharing – including remainders** See Y3 guidance - same principle **2 digit divided by 1 digit all 4 possibilities – moving to short division layout** For all 4 informal possibilities – please see Year 3 examples as it is the same principle. £72 shared between three using short division layout  **3 digit divided by 1 digit all 4 possibilities – moving to short division layout** £705 shared between three using short division layout  	Divide Share equally, one each, two each…, Grouping equal groups, how many lots of, groups of… half of halved symbol ÷ Remainder Left over Repeated subtraction dividend divisor	100 square Number lines Number tracks Bead strings (for children) Bead bar Tens Frame Numicon Place Value Disks Cuisenaire Base hundreds tens and ones Arrow Cards Gattegno chart Place Value Grid

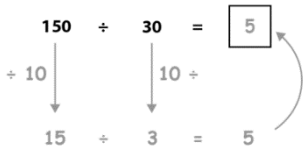
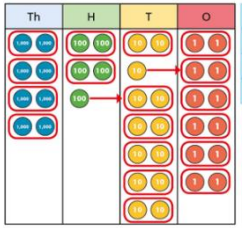
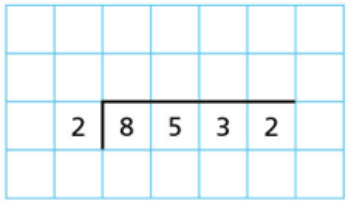
	Know the vocabulary for division equations see below    	**Related Calculations** E.g. 1200 pencils shared between 6 classes 	**Related Calculations** E.g. 1200 pencils shared between 6 classes **Can be drawn out**	**Related Calculations** E.g. 1200 pencils shared between 6 classes  	quotient a tenth of the size	
		Develop fluency in efficient written method of short division with exact answers when dividing by a one-digit number. (e.g. 11 ÷ 2 expressed as 5 ½ or 5.5 not 5 remainder 1) Solve two step problems with increasingly harder numbers including correspondence questions such as three cakes shared equally between 10 children. Introduce dividing using subtracting 10 lots of divisor and asking 'how many more left over?' 52 ÷ 4 I know that 10 lots of 4 are 40, there will be 12 left over which is another 3 lots of 4 so there are 13 lots of 4 in 52				

Year 5 Division

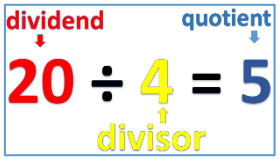
	Mental Strategies	Concrete	Pictorial	Abstract	Vocabulary	Models, Images and resources
Year 5	Divide numbers mentally using known facts for all multiplication tables to 12 x 12 Divide whole numbers and decimals by 10, 100 or 1000, e.g. 25 ÷ 10, 673 ÷ 100, 74 ÷ 100 Some examples using place value charts    	**Apply division facts for all multiplication tables in contexts of grouping and sharing – including remainders** See Y3 guidance - same principle **4 digit divided by 1 digit all 4 possibilities – moving to short division layout** Children should be confident enough to work in the abstract with this due. If needed, place value systems can still be used. 8,532 ÷ 2  **Related Calculations** Division involving decimals 1.2 ÷ 3  	**Apply division facts for all multiplication tables in contexts of grouping and sharing – including remainders** See Y3 guidance - same principle **4 digit divided by 1 digit all 4 possibilities – moving to short division layout** Children should be confident enough to work in the abstract with this due. If needed, place value systems can still be used and drawings to represent the values **Related Calculations** Division involving decimals 1.2 ÷ 3  	**Apply division facts for all multiplication tables in contexts of grouping and sharing – including remainders** See Y3 guidance - same principle **4 digit divided by 1 digit all 4 possibilities – moving to short division layout**  **Related Calculations** Division involving decimals 1.2 ÷ 3  	Divide Share equally, one each, two each…, Grouping equal groups, how many lots of, groups of… half of halved symbol ÷ Remainder Left over Repeated subtraction dividend divisor	100 square Number lines Number tracks Bead strings (for children) Bead bar Tens Frame Numicon Place Value Disks Cuisenaire Base hundreds tens and ones Arrow Cards Gattegno chart Place Value Grid

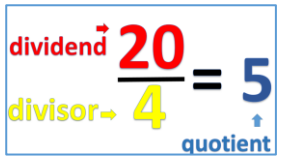
	Find the whole number remainder after dividing a two-digit number by a single-digit number, e.g. 27 ÷ 4 = 6 R 3 Know the vocabulary for division equations see below  	Practise and extend efficient written methods applying X tables and related facts confidently for larger calculations. Divide up to a four-digit number by a one-digit number using efficient short division. Solve problems including scaling by simple fractions Use x and ÷ as inverses to support dividing by powers of 10 in scale drawings or in converting units e.g. km to m	quotient a tenth of the size	

Year 6 Division

	Mental Strategies	Concrete	Pictorial	Abstract	Vocabulary	Models, Images and resources
Year 6	Divide two-digit number by a one-digit number, e.g. 68 ÷ 4 Divide by 25 or 50, e.g. 480 ÷ 25, 3200 ÷ 50 Divide two-digit decimals e.g. 4.8 ÷ 6 and find halves of decimals with units and tenths, e.g. half of 15.2 Divide multiples of 100 by a multiple of 10 or 100 (whole number answers), e.g. 600 ÷ 20, 800 ÷ 400, 2100 ÷ 300 plus related facts e.g. 150 ÷ 30  Scale up and down using known facts, e.g. given that six oranges cost 24p, find the cost of four oranges	**Multiple digit divided by 1 digit with all 4 possibilities** Children should be confident enough to work in the abstract with this. If needed, place value counters can still be used. 8,532 ÷ 2  **Use short division to convert remainders to decimals** Children should be confident enough to work in the abstract with this. If needed, place value counters can still be used. **Dividing with a two-digit number using factors** Children should be confident enough to work in the abstract with this. If needed, place value counters can still be used.	**Multiple digit divided by 1 digit with all 4 possibilities** Children should be confident enough to work in the abstract with this. If needed, place value counters can still be used and drawings to represent the values **Use short division to convert remainders to decimals** Children should be confident enough to work in the abstract with this. If needed, place value counters can still be used. **Dividing with a two-digit number using factors** Children should be confident enough to work in the abstract with this. If needed, place value counters can still be used.	**Multiple digit divided by 1 digit with all 4 possibilities**  **Use short division to convert remainders to decimals** 109 ÷ 4 = 27.25 $$\begin{array}{r} 2\,7\cdot2\,5 \\ 4\overline{)\,1\;0\;{}^{2}9\cdot{}^{1}0\;{}^{2}0} \end{array}$$ **Dividing with a two-digit number using factors** 2560 ÷ 16 = 2560 ÷ 4 ÷ 4 $$\begin{array}{r} 0\;6\;4\;0 \\ 4\overline{)\,2\;{}^{2}5\;{}^{1}6\;0} \end{array} \Rightarrow \begin{array}{r} 1\;6\;0 \\ 4\overline{)\,6\;{}^{2}4\;0} \end{array}$$	Divide Share equally, one each, two each…, Grouping equal groups, how many lots of, groups of… half of halved symbol ÷ Remainder Left over Repeated subtraction dividend	100 square Number lines Number tracks Bead strings (for children) Bead bar Tens Frame Numicon Place Value Disks Cuisenaire Base hundreds tens and ones Arrow Cards Gattegno chart Place Value Grid

Know the vocabulary for division equations see below





Dividing with a two-digit number using partitioning

Children should be confident enough to work in the abstract with this. If needed, place value counters can still be used.

Counters can also be used to create the multiplication table to support the division.

Dividing with a two-digit number using short division

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Dividing with a two-digit number using partitioning

When undertaking a division using two-digit numbers. Create a multiple chart first – start with 10 and 5, then 2, 4, 8. If other multiples are required, calculate when needed.

	31	mental method
x1	31	x1
x2	62	double 31
x3	93	add 31 to 62
x4	124	double 62
x5	155	half of 310
x6	186	double 93
x7	217	186 + 31
x8	248	double 124
x9	279	248 + 31
x10	310	easy to calculate

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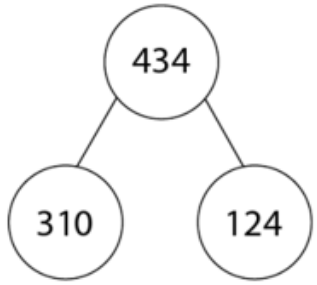


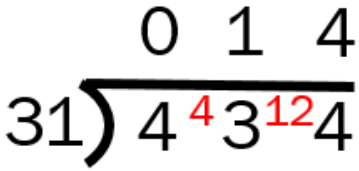
310 ÷ 31 = 10

124 ÷ 31 = 4

434 ÷ 31 = 14

Dividing with a two-digit number using short division

See adjacent column to support this



divisor

quotient

a tenth of the size

Dividing with a two-digit number using long division

Children should be confident enough to work in the abstract with this. If needed, place value counters can still be used.

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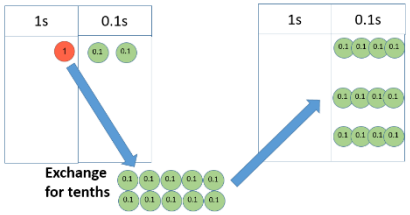
Related Calculations

Division involving decimals
1.2 ÷ 3



Dividing with a two-digit number using long division

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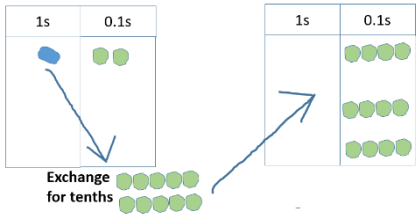

Dividing with a two-digit number using long division

See adjacent column to support this

$$
\begin{array}{r}
0\ 1\ 4 \\
31\overline{)\ 4\ 3\ 4} \\
-\ 3\ 1 \\
\hline
1\ 2\ 4 \\
1\ 2\ 4 \\
\hline
0
\end{array}
$$

Related Calculations

Division involving decimals
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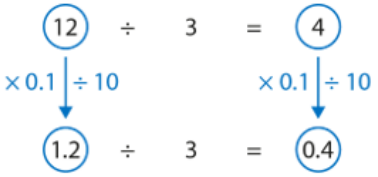

		Divide numbers up to four-digits by a two-digit whole number using efficient written method of long division, and interpret remainders as whole numbers, fractions, decimals fractions or by rounding as appropriate for the context Other worked examples of formal written division methods – with a remainder		

$354 \div 15 = ?$

$\begin{array}{r} 23\ r9 \\ 15\overline{)354} \\ -30 \\ \hline 54 \\ -45 \\ \hline 9 \end{array}$	$\begin{array}{r} 23\ \frac{9}{15} \\ 15\overline{)354} \\ -30 \\ \hline 54 \\ -45 \\ \hline 9 \end{array}$	$\begin{array}{r} 23.6 \\ 15\overline{)354.0} \\ -30 \\ \hline 54 \\ -45 \\ \hline 90 \\ -90 \\ \hline 0 \end{array}$
So, $354 \div 15 = 23$ r 9	$\frac{9}{15} = \frac{3}{5}$ So, $354 \div 15 = 23\frac{3}{5}$	So, $354 \div 15 = 23.6$