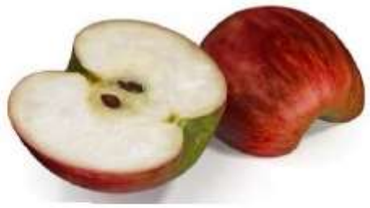
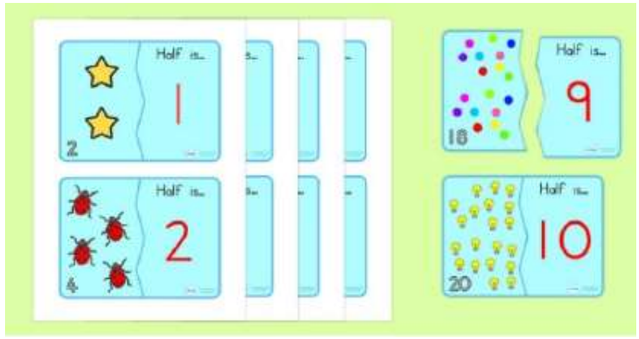
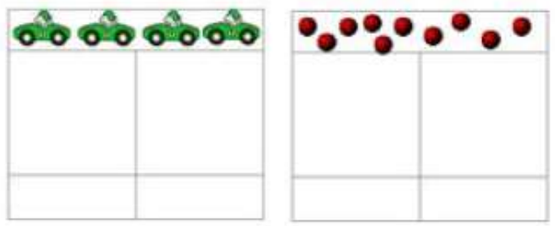
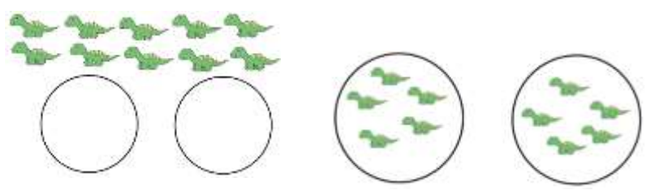
Deeping St James Community Primary Calculation Policy – Division

EYFS

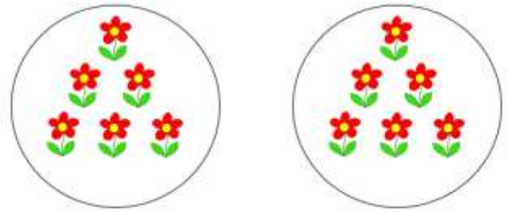
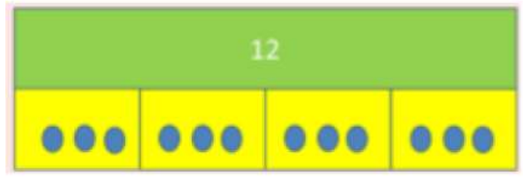
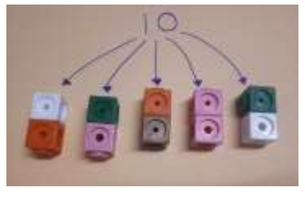
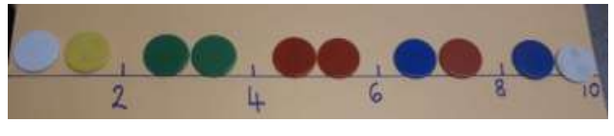
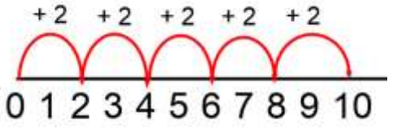
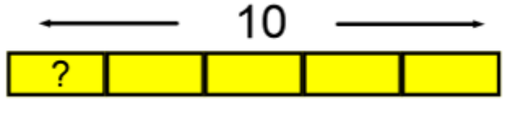
Key Vocabulary: sharing, halving, number patterns, equal

Objective & Strategy	Concrete	Pictorial	Abstract
-Begin to solve problems including halving and sharing. -Halving a whole, halving a quantity of objects. -Sharing a quantity of objects.	   Children have the opportunity to physically cut objects, food or shapes in half. Children will explore halving and demonstrate it practically.  Counting and other practical maths resources will be used for the children to share into two equal groups. Children start with an even number and will need to share this out equally in a given group. e.g. 10 ÷ 2 = 5   Use of visual supports such as halving mats and part part whole, with the physical objects and resources that can be manipulated. 	 Pictures and icons that encourage children to see concept of halving in relation to subitising, addition and subtraction knowledge. i.e. Knowing 4 is made of 2 groups of 2, so half of 4 is 2.  Bar model with pictures or icons to support understanding of finding 2 equal parts of a number, to further understand how two halves make a whole. Opportunities to understand equal groups and share items out in play and problem solving. **Step 1:** Count how many you have. **Step 2:** Share them equally so each group has the same amount. **Step 3:** Count how many are in each group. 	

Deeping St James Community Primary Calculation Policy – Division

Year 1

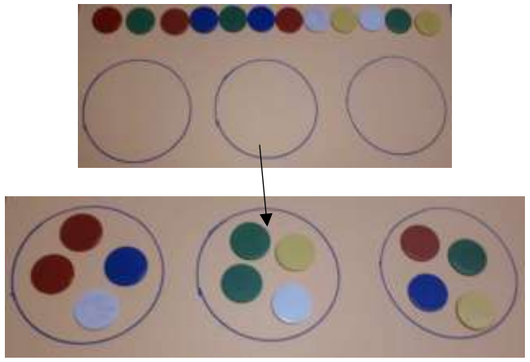
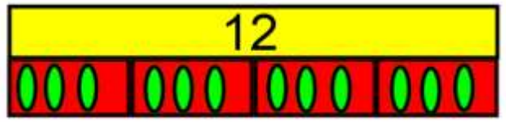
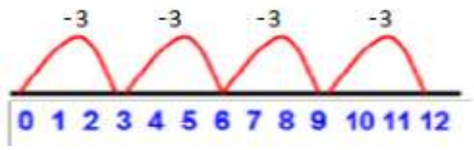
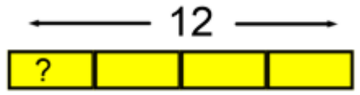
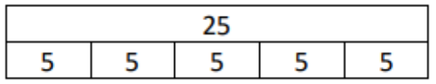
Key Vocabulary: sharing, halving, number patterns, equal, share, share equally, one each, two each…, group, groups of, lots of, array, half, division, dividing, grouping, array, pattern, equal grouping, equal sharing

Objective & Strategy	Concrete	Pictorial	Abstract
-To divide by sharing -To halve a number up to 20.	Use concrete resources (cubes, bead strings, counters) to share into equal groups. Children will also be able to half a number up to 20 by sharing into equal groups.   'I know there are **2** groups so I can share **12** counters which will equal **6** in each group.'	Draw jottings and have pictorial representations to demonstrate knowledge of sharing into equal groups. 12 ÷ 2 = 6  I know there are 2 groups and in each group there are 6 flowers. 12 ÷ 4 = 3 	Introduce to word problems to solve division sharing problems. 6 sweets are shared between 2 people. How many do they have each? **12 ÷ 2 = 6** 'I know there are **2** groups so I can share **12** counters which will equal **6** in each group.'
-To divide by grouping.	Begin to solve division problems, which require sorting objects and quantities into 2s, 4s, 5s and 10s. Use concrete resources such as cubes, counters or objects to aid understanding. 10 ÷ 5 = 2  	Use number lines to show grouping. 10 ÷ 2 = 5  Investigate dividing by grouping using the bar model. The children will be given a number or picture representatives. This will represent the whole. They then need to split the whole into the number of groups they are dividing by and work out how many would be in each group. e.g. 10 ÷ 5 = 2 	Introduce to word problems to solve division grouping problems. There are 10 flower bulbs. Plant 2 in each pot. How many pots are there? **10 ÷ 2 = 5** There are 10 flower bulbs. Plant 5 in each pot. How many pots are there? **10 ÷ 5 = 2**

Deeping St James Community Primary Calculation Policy – Division

Year 2

Key Vocabulary: sharing, halving, number patterns, equal, share, share equally, one each, two each…, group, groups of, lots of, array, half, division, dividing, grouping, array, pattern, equal grouping, equal sharing, divide, divided by, divided into, number line, left, left over, inverse,

Objective & Strategy	Concrete	Pictorial	Abstract
-To divide by sharing.	Use a range of concrete resources (cubes, counters, base 10) to share quantities into equal groups. I have 12 counters; can you share them equally into 3 groups? 	Use pictures and shapes to share quantities. 12 ÷ 3 = 4  Use the bar models to show and support their understanding. e.g. 12 ÷ 4 = 3 	Record division number sentence using the divide symbol. **12 ÷ 3 = 4** **12 ÷ 4 = 3**
-To divide by grouping (repeated subtraction)	Begin to solve division problems, which require sorting objects and quantities into 2s, 4s, 5s and 10s. Use concrete resources such as cubes, counters, bead strings or objects to aid understanding.   	Use number lines to show grouping as repeated subtraction.  Pictorial representation of grouping using the bar model. The children will be given a number or picture representatives. This will represent the whole. They then need to split the whole into the number of groups they are dividing by and work out how many would be in each.  	Record division number sentence using the divide symbol. 12 shared by 3 equals 4 There are 12 flower bulbs. Plant 3 in each pot. How many pots are there? **12 ÷ 3 = 4** There are 12 flower bulbs. Plant 4 in each pot. How many pots are there? **12 ÷ 4 = 3**

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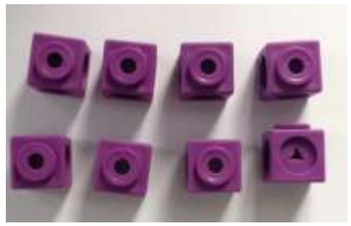
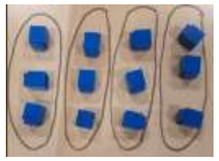
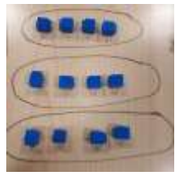
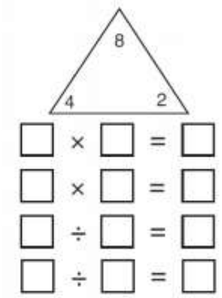
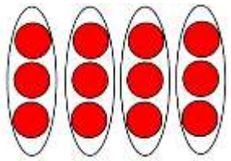
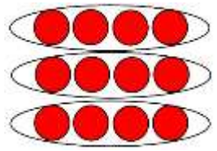
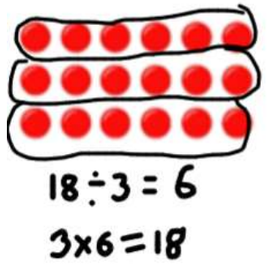
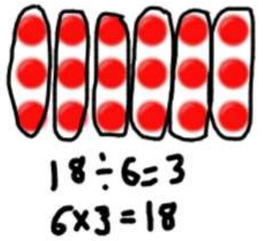
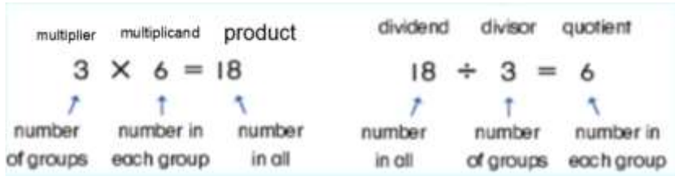
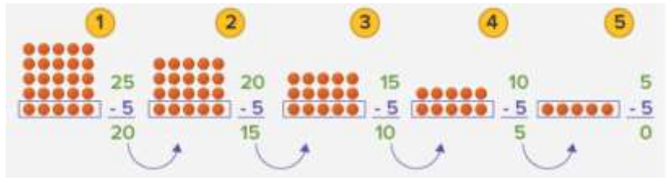
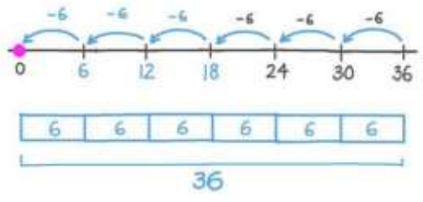
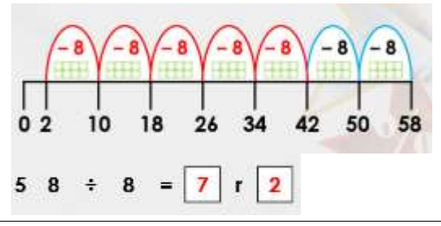
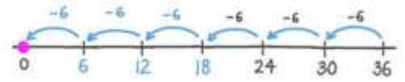
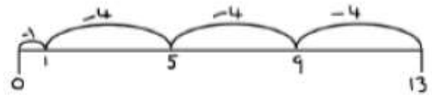
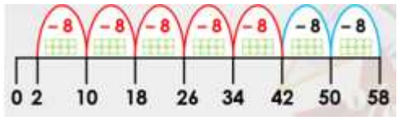
-To use related multiplication and division facts using the inverse for the 2-, 3-, 5- and 10-times table. This should be taught alongside multiplication to show how the numbers relate and build fluency.	Use concrete resources (cubes, counters, base 10) to represent arrays. These will then form part of the learning process to explain number related facts and begin to write these in number form. 2 x 4 =8 4 x 2 = 8 8 ÷ 2 = 4 8 ÷ 4 = 2    How many groups of 3 in 12? 12 ÷ 3 = 4 How many groups of 4 in 12? 12 ÷ 4 = 3	Use pictorial representations to solve missing number facts that demonstrate related facts.  Use a range of pictures to represent arrays to show different calulations and show commuatativity. 12 ÷ 3 = 4 12 ÷ 4 = 3  	Record all 8 related number sentences to demonstrate related facts. **2 x 4 = 8** **4 x 2 = 8** **8 ÷ 2 = 4** **8 ÷ 4 = 2** **8 = 2 x 4** **8 = 4 x 2** **2 = 8 ÷ 4** **4 = 8 ÷ 2**

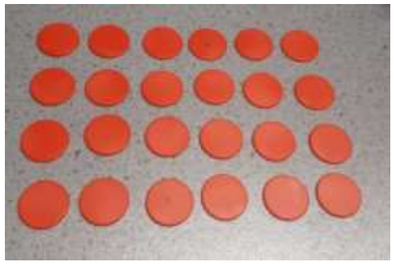
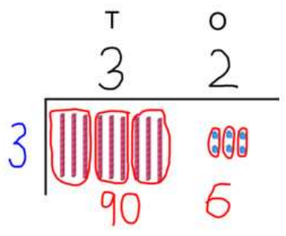
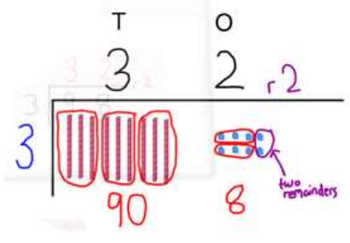
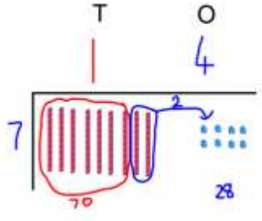
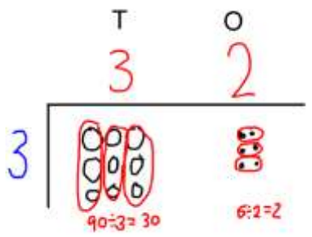
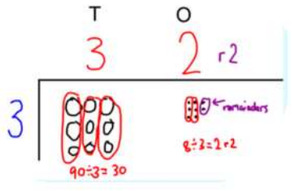
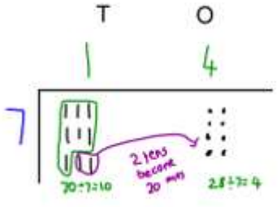
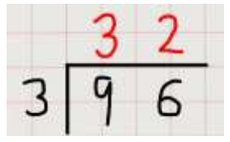
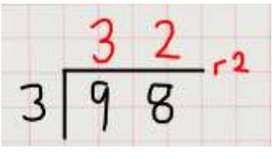
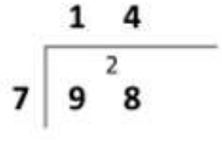
Deeping St James Community Primary Calculation Policy – Division

Year 3

Key Vocabulary: sharing, halving, number patterns, equal, share, share equally, one each, two each…, group, groups of, lots of, array, half, division, dividing, grouping, array, pattern, equal grouping, equal sharing, divide, divided by, divided into, number line, left, left over, inverse, short division, 'carry', remainder, multiple

Objective & Strategy	Concrete	Pictorial	Abstract
-To use related multiplication and division facts using the inverse for the 2-, 3-, 4-, 5-, 8- and 10- times table.	Use concrete apparatus (base 10, counters, cubes) to understand the link between multiplication and division and to find related facts. 3 x 6= 18 18 ÷ 3 = 6 6 x 3 = 18 18 ÷ 6 = 3  	Use pictorial representations to show an array pictorially then find the associated multiplication and division facts by sorting into equal groups.  	Apply understanding of inverse relationships to write related multiplication and division statements. 3 x 6 = 18 18 = 3 x 6 6 x 3 = 18 18 = 6 x 3 18 ÷ 3 = 6 6 = 18 ÷ 3 18 ÷ 6 = 3 3 = 18 ÷ 6 Use associated vocabulary correctly and know what each number represents in the calculation. 
-To using grouping to divide. (repeated subtraction) *Introduce remainders in division.	Use concrete resources (cubes, counters, bead strings) to divide by grouping. Make the total number and then repeatedly subtract groups of the divisor.  When working with divisions that have a remainder the pupils will not get down to 0 counters, they will have an amount left over – the remainder.	Continue to use repeated subtraction on the number line but will work with increasingly large numbers. 36 ÷ 6 = 6 Children will count back from in 6s from 36 until they reach 0. Bar models will continue to support understanding of equal groups.  Begin to introduce remainders – how many are left over – when grouping. 	Record written division using number lines: 36 ÷ 6 = 6  Record written division using number lines, including remainders: 13 ÷ 4 = 3 r 1 '3 groups of 4, with 1 left over'  58 ÷ 8 = 7 

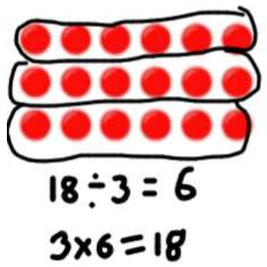
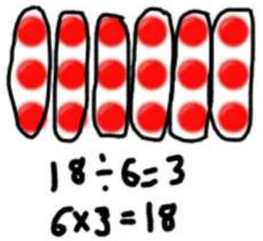
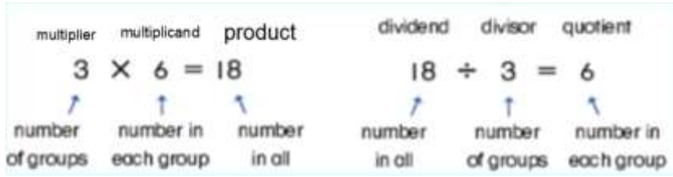
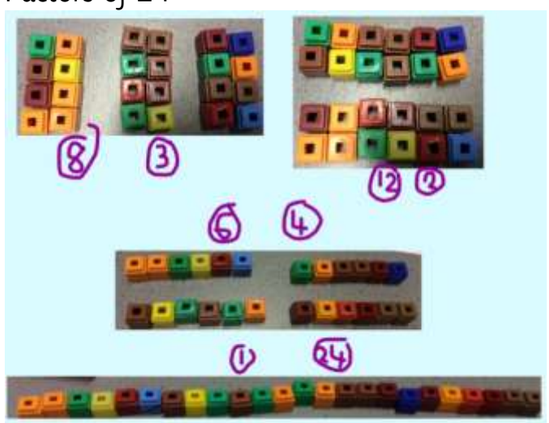
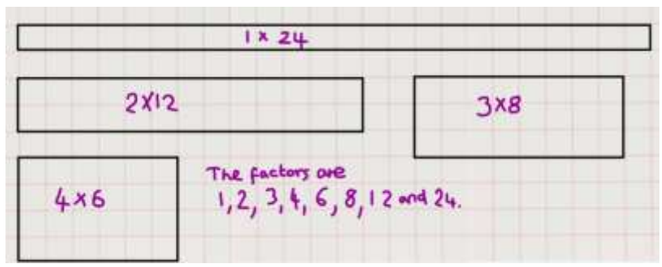
Deeping St James Community Primary Calculation Policy – Division

-To use arrays to divide.	Link division to multiplication by using arrays. They will begin writing numbers sentences to show what they can create.  6 x 4 = 24 4 x 6 = 24 24 ÷ 6 = 4 24 ÷ 4 = 6	Draw or be given a pictorial representation of an array. They will circle the array to split it into groups to make multiplication and division sentences. 24 ÷ 6 = 4  'I know **24 ÷ 6 = 4** because **6** groups of **4** equals **24**'	Find the inverse of multiplication and division sentences by creating linking number sentences. **6 x 4 = 24** **4 x 6 = 24** **24 ÷ 6 = 4** **24 ÷ 4 = 6**
-To use a formal written method for division. (short division). 2-digit ÷ 1-digit number	Use concrete apparatus (place value counters, counters, base 10) to support the understanding of the formal method of short multiplication. Partition the dividend and put inside the short division sign then divide each part by the divisor. The quotient is then recorded on the top line. 96 ÷ 3 = 32  98 ÷ 3 = 32 r 2  98 ÷ 7 = 14 	Represent divisions using informal jottings and pictorial representations. 96 ÷ 3 = 32  98 ÷ 3 = 32 r 2  98 ÷ 7 = 14 	Formal written short division method: When secure the children use the short division sign to record the abstract division. Children should still use pictorial representations if required at this stage as this will be developed and embedded in Y4. 96 ÷ 3 = 32  98 ÷ 3 = 32 r 2  98 ÷ 7 = 14 

Deeping St James Community Primary Calculation Policy – Division

Year 4

Key Vocabulary: sharing, halving, number patterns, equal, share, share equally, one each, two each…, group, groups of, lots of, array, half, division, dividing, grouping, array, pattern, equal grouping, equal sharing, divide, divided by, divided into, number line, left, left over, inverse, short division, 'carry', remainder, multiple, divisible by, factor

Objective & Strategy	Concrete	Pictorial	Abstract
-To recall multiplication and division facts for multiplication tables up to 12x 12.	Use concrete apparatus (base 10, counters, cubes) to understand the link between multiplication and division and to find related facts. 3 x 6= 18 18 ÷ 3 = 6 6 x 3 = 18 18 ÷ 6 = 3  	Use pictorial representations to show an array pictorially then find the associated multiplication and division facts by sorting into equal groups.  	Apply understanding of inverse relationships to write related multiplication and division statements. 3 x 6 = 18 18 = 3 x 6 6 x 3 = 18 18 = 6 x 3 18 ÷ 3 = 6 6 = 18 ÷ 3 18 ÷ 6 = 3 3 = 18 ÷ 6 Use associated vocabulary correctly and know what each number represents in the calculation. 
-To recognise and use factor pairs, understanding the links with multiplication.	Use physical objects to create arrays to support their understanding of factors. Factors of 24 	Investigate finding all factors of a number by drawing arrays. Factors of 24 	Use their knowledge of multiplication and division facts to find factors of numbers. Factors of 24 **1 x 24 = 24** **2 x 12= 24** **3 x 8 = 24** **4 x 6 = 24**

Deeping St James Community Primary Calculation Policy – Division

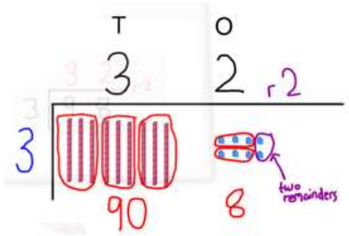
Pupils should be using formal written methods of short division when appropriate.

-To use a formal written method for division. (short division).

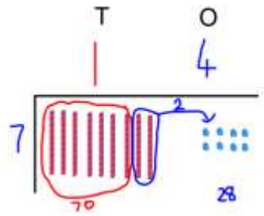
2/3-digit ÷ 1-digit number

Continuation/ Progression from Y3.
Use concrete apparatus (place value counters, counters, base 10) to support the understanding of the formal method of short multiplication.
Partition the dividend and put inside the short division sign then divide each part by the divisor. The quotient is then recorded on the top line.

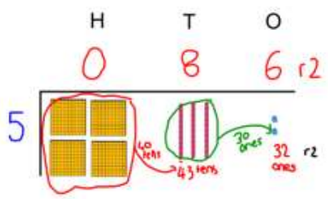
98 ÷ 3 = 32 r 2



98 ÷ 7 = 14

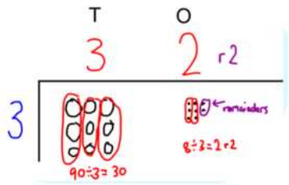


432 ÷ 5 = 86 r 2



Represent divisions using informal jottings and pictorial representations.

98 ÷ 3 = 32 r 2



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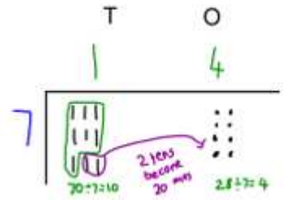
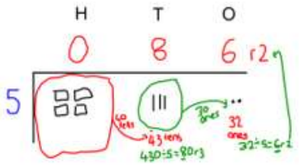


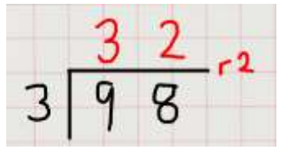
432 ÷ 5 = 86 r 2



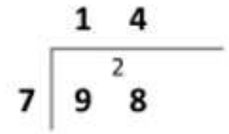
Formal written short division method:

When secure the children use the short division sign to record the abstract division. Children may still use pictorial representations at this stage as this will be embedded in Y5.

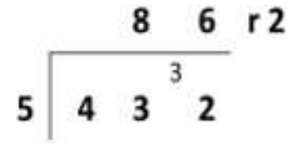
98 ÷ 3 = 32 r 2



98 ÷ 7 = 14



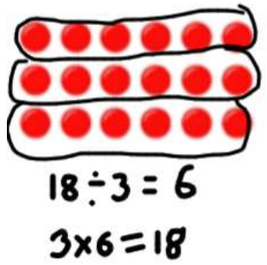
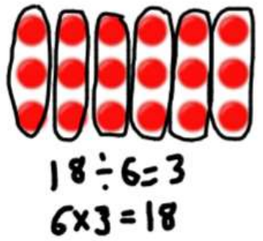
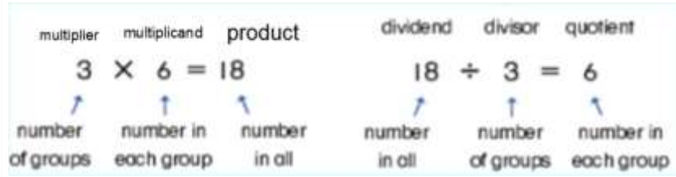
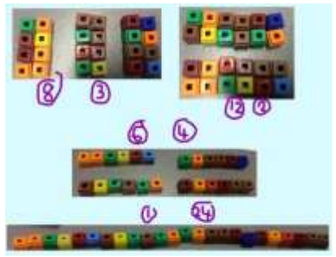
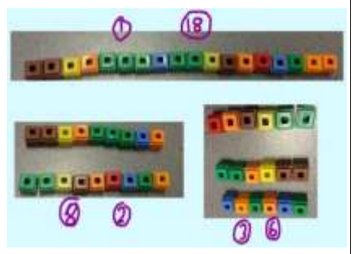
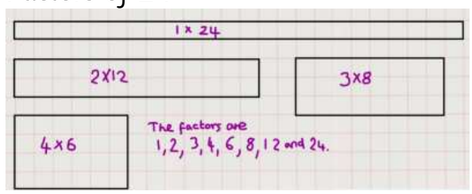
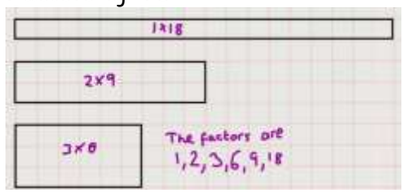
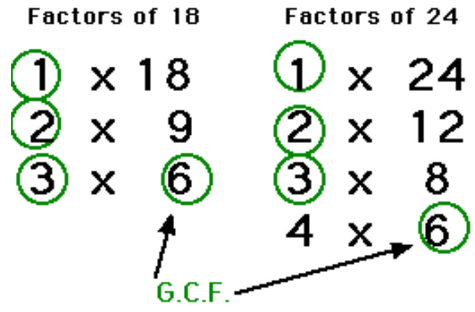
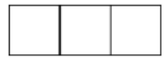
432 ÷ 5 = 86 r 2



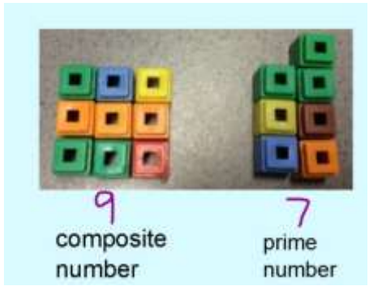
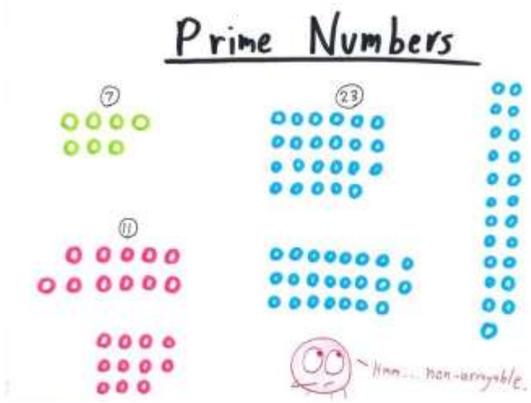
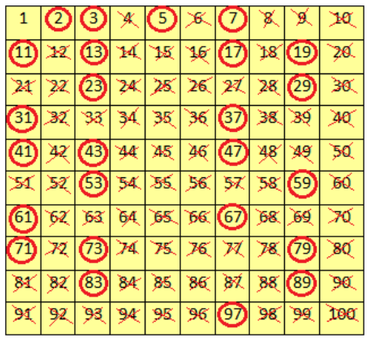
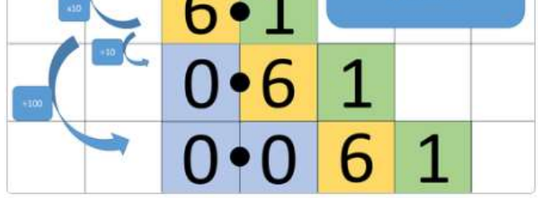
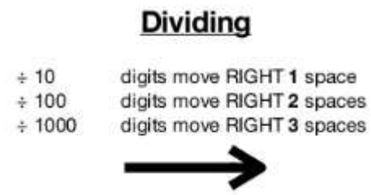
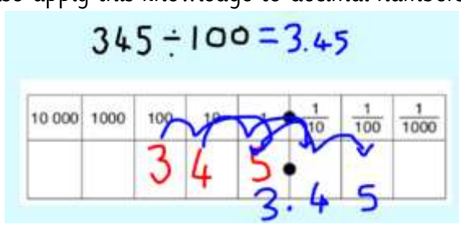
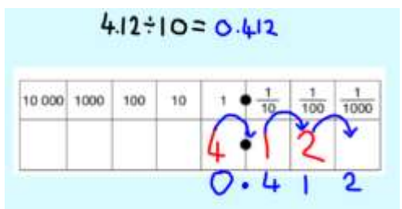
Deeping St James Community Primary Calculation Policy – Division

Years 5

Key Vocabulary: sharing, halving, number patterns, equal, share, share equally, one each, two each…, group, groups of, lots of, array, half, division, dividing, grouping, array, pattern, equal grouping, equal sharing, divide, divided by, divided into, number line, left, left over, inverse, short division, 'carry', remainder, multiple, divisible by, factor, quotient, integer, prime number, prime factors, composite number (non-prime)

Objective & Strategy	Concrete	Pictorial	Abstract
-To recall multiplication and division facts for multiplication tables up to 12x 12.	Use concrete apparatus (base 10, counters, cubes) to understand the link between multiplication and division and to find related facts. 3 x 6= 18 18 ÷ 3 = 6 6 x 3 = 18 18 ÷ 6 = 3  	Use pictorial representations to show an array pictorially then find the associated multiplication and division facts by sorting into equal groups.  	Apply understanding of inverse relationships to write related multiplication and division statements. 3 x 6 = 18 18 = 3 x 6 6 x 3 = 18 18 = 6 x 3 18 ÷ 3 = 6 6 = 18 ÷ 3 18 ÷ 6 = 3 3 = 18 ÷ 6 Use associated vocabulary correctly and know what each number represents in the calculation. 
-To recognise and use factor pairs of a number and find common factors of two numbers.	Use physical objects to create arrays to support their understanding of factors. Find the common factors of 18 and 24 Factors of 24 Factors of 18   The common factors are 1, 2, 3 and 6.	Investigate finding factors by drawing arrays to find all solutions. They then find factors which belong to both numbers. Find the common factors of 18 and 24 Factors of 24  Factors of 18  The common factors are 1, 2, 3 and 6.	Use multiplication and division facts to find factors of numbers. Find the common factors of 18 and 24  The common factors are 1, 2, 3 and 6. This three-digit number has **2** and **7** as **factors**. 2 9 4 Write another **three-digit** number which has **2** and **7** as **factors**. 

Deeping St James Community Primary Calculation Policy – Division

-To establish whether a number up to 100 is prime and recall prime numbers up to 19.	Find prime numbers and composite (non-prime numbers) by using arrays. Understand that composite numbers form arrays and prime numbers cannot be arranged into arrays. 	Use jottings and pictorial representations to investigate composite and prime numbers. 	Use knowledge of multiples and factors to find the prime numbers up to 100. Eliminate numbers that have factors other than 1. Recall all prime numbers up to 19. 
-To divide whole numbers and those involving decimals by 10, 100 and 1,000	Use resources (place value cards) to understand what 10, 100 and 1000 times smaller looks like. 	Use place value grids to divide numbers by 10, 100 and 1000s. They understand the movement of the digits on the place value grid.  Also apply this knowledge to decimal numbers.  	Apply knowledge of place value to divide numbers by 10, 100 and 1000, including decimal numbers. 3450 ÷ 10 = 345 345 ÷100 = 3.45 2.67 ÷ 10 = 0.267 12.7÷1000 = 0.0127 Apply knowledge to word and number puzzles. Circle the number that is **10 times** greater than nine hundred and seven. 9,700 907 9,007 970 9,070 Write the missing number to make this **division** correct. 75 ÷ ☐ = 7.5 *A PS4 is on for sale at a tenth of its original price. It usually costs£450.90. How much is it at the sales?*

Deeping St James Community Primary Calculation Policy – Division

At this stage pupils should be encouraged to work in the abstract using the formal method to divide larger numbers efficiently.

-To use a formal written method for division. (short division).

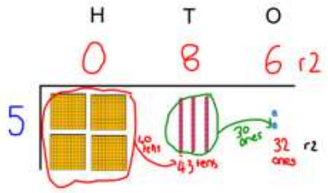
3/4-digit ÷ 1-digit number

Continuation/ Progression from Y4.

Use concrete apparatus (place value counters, counters, base 10) to support the understanding of the formal method of short multiplication.

Partition the dividend and put inside the short division sign then divide each part by the divisor. The quotient is then recorded on the top line.

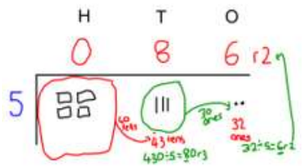
432 ÷ 5 = 86 r 2



Apply this same representation when using 4-digit ÷ 1-digit numbers

Represent divisions using informal jottings and pictorial representations.

432 ÷ 5 = 86 r 2

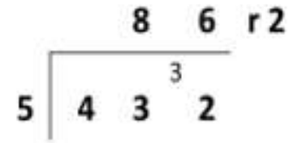


Apply this same representation when using 4-digit ÷ 1-digit numbers

Formal written short division method:

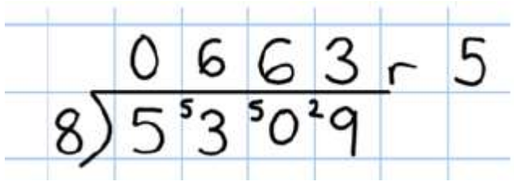
Children should be secure at this method by the end of Y5 and be able to use this in the abstract confidently.

432 ÷ 5 = 86 r 2



Children are expected to interpret non-integer answers by expressing results as fractions (432÷5 = 86 $\frac{2}{5}$), decimals (432÷5 = 86.4) or by rounding (432÷5 = 86.4 ≈ 86 sweets) according to the context.

5309 ÷ 8 = 663 r 5



Deeping St James Community Primary Calculation Policy – Division

Years 6

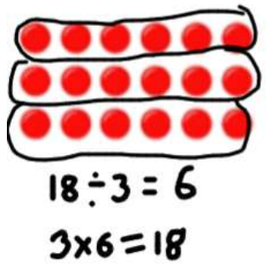
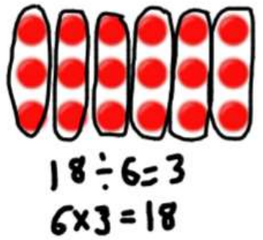
Key Vocabulary: sharing, halving, number patterns, equal, share, share equally, one each, two each…, group, groups of, lots of, array, half, division, dividing, grouping, array, pattern, equal grouping, equal sharing, divide, divided by, divided into, number line, left, left over, inverse, short division, 'carry', remainder, multiple, divisible by, factor, quotient, integer, prime number, prime factors, composite number (non-prime), common factor

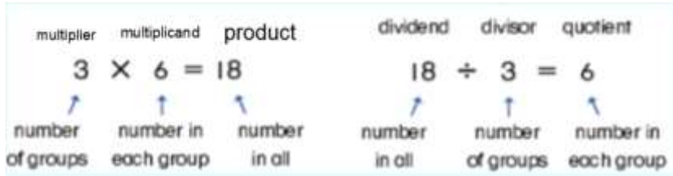
<table>
<tr><th>Objective & Strategy</th><th>Concrete</th><th>Pictorial</th><th>Abstract</th></tr>
<tr>
<td>At this stage pupils should be encouraged to work in the abstract.

-To recall multiplication and division facts for multiplication tables up to 12x 12.</td>
<td>Use concrete apparatus (base 10, counters, cubes) to understand the link between multiplication and division and to find related facts.

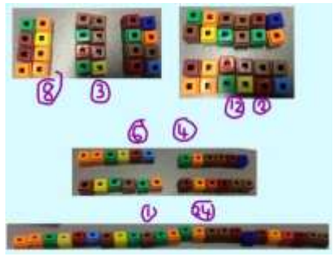
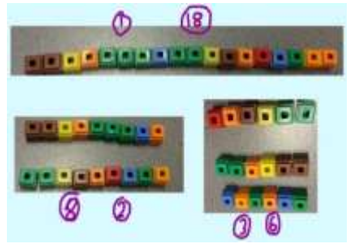
3 x 6= 18 18 ÷ 3 = 6 6 x 3 = 18 18 ÷ 6 = 3

   </td>
<td>Use pictorial representations to show an array pictorially then find the associated multiplication and division facts by sorting into equal groups.

 
  </td>
<td>Apply understanding of inverse relationships to write related multiplication and division statements.
3 x 6 = 18 18 = 3 x 6
6 x 3 = 18 18 = 6 x 3
18 ÷ 3 = 6 6 = 18 ÷ 3
18 ÷ 6 = 3 3 = 18 ÷ 6

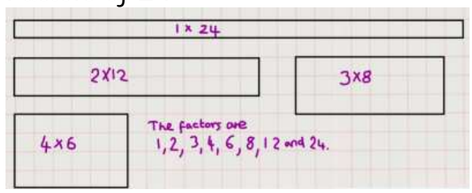
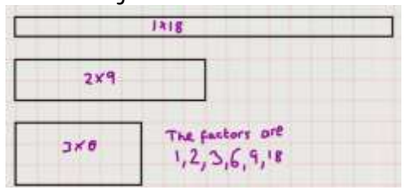
Use associated vocabulary correctly and know what each number represents in the calculation.
  </td>
</tr>
<tr>
<td>-To identify common factors.</td>
<td>Use physical objects to create arrays to support their understanding of factors.

Find the common factors of 18 and 24

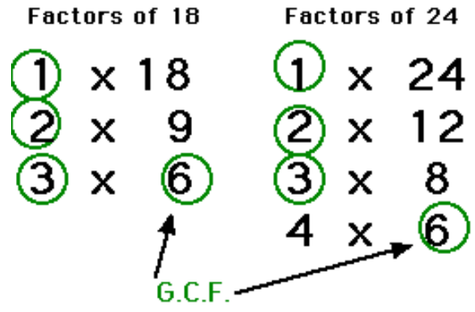
Factors of 24 Factors of 18
  

The common factors are 1, 2, 3 and 6.</td>
<td>Investigate finding factors by drawing arrays to find all solutions. They then find factors which belong to both numbers.

Find the common factors of 18 and 24

Factors of 24
 
Factors of 18
 

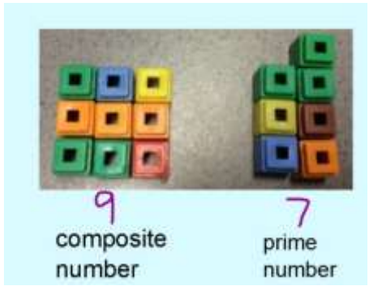
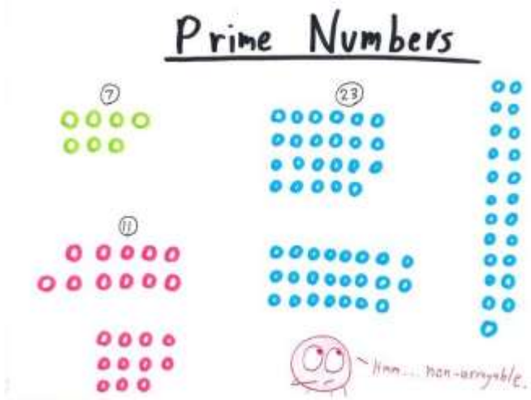
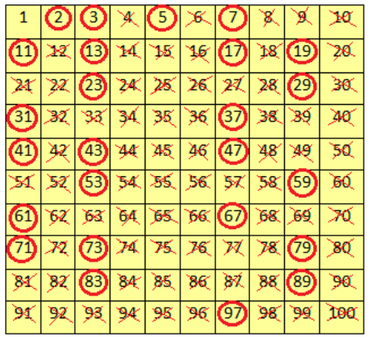
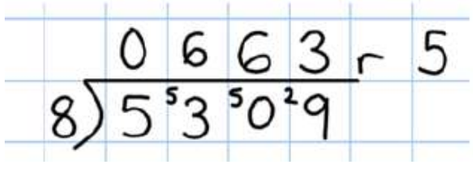
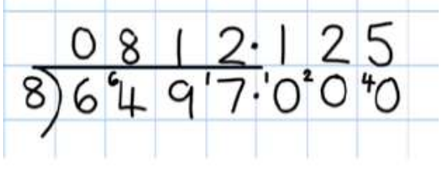
The common factors are 1, 2, 3 and 6.</td>
<td>Use multiplication and division facts to find factors of numbers.

Find the common factors of 18 and 24
 

The common factors are 1, 2, 3 and 6.

This three-digit number has 2 and 7 as factors.
2 9 4
Write another three-digit number which has 2 and 7 as factors.</td>
</tr>
</table>

Deeping St James Community Primary Calculation Policy – Division

-To know whether a number up to 100 is prime and recall prime numbers up to 100.	Find prime numbers and composite (non-prime numbers) by using arrays. Understand that composite numbers form arrays and prime numbers cannot be arranged into arrays.  	Use jottings and pictorial representations to investigate composite and prime numbers.  	Use knowledge of multiples and factors to find the prime numbers up to 100. Eliminate numbers that have factors other than 1. Recall all prime numbers up to 100. 
At this stage pupils should be encouraged to work in the abstract using the formal short division method to divide larger numbers efficiently. -To use a formal written method for division. (short division). 3/4-digit ÷ 1-digit number including decimals	**See Year 5** Apply this same representation when using 4-digit ÷ 1-digit numbers including decimals.	**See Year 5** Apply this same representation when using 4-digit ÷ 1-digit numbers including decimals.	Formal written short division method: Children should be secure at this method and be able to use this in the abstract confidently. Children are expected to interpret non-integer answers by expressing results as fractions (432÷5 = 86 $\frac{2}{5}$), decimals (432÷5 = 86.4) or by rounding (432÷5 = 86.4 ≈ 86 sweets) according to the context. 5309 ÷ 8 = 663 r 5  6497 ÷ 8 = 812.125  **Calculating a decimal remainder:** In this example, rather than expressing the remainder as **r 1**, a decimal point is added after the ones because there is still a remainder, and the one remainder is carried onto zeros after the decimal point (to show there was no decimal value in the original number). Children keep dividing to an appropriate degree of accuracy for the problem being solved.

Deeping St James Community Primary Calculation Policy – Division

At this stage pupils should be encouraged to work in the abstract using the formal short division method to divide larger numbers efficiently.

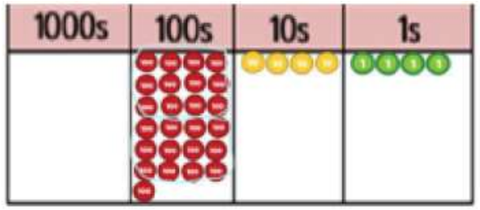
-To use a formal written method of long division.

-Divide larger numbers ÷ 2-digit numbers (involving remainders).

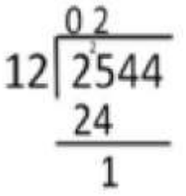
Represent calculations using the place value counters.

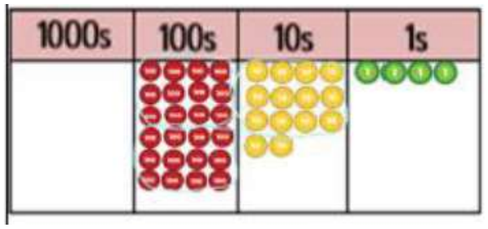
2544 ÷ 12

We can't group 2 thousands into groups of 12 so we will exchange them.

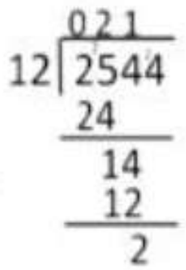


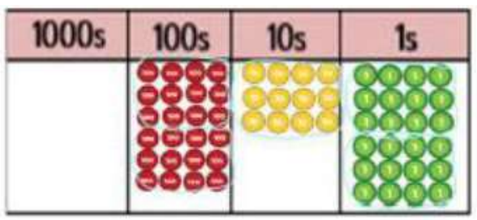
We can group 24 hundreds into groups of 12 which leaves with 1 hundred.



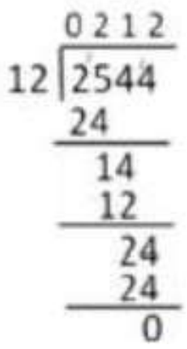


After exchanging the hundred, we have 14 tens. We can group 12 tens into a group of 12, which leaves 2 tens.





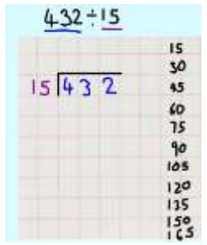
After exchanging the 2 tens, we have 24 ones. We can group 24 ones into 2 groups of 12, which leaves no remainder.



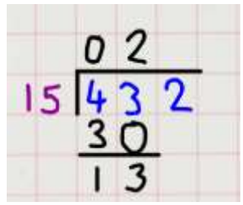
Record written calculation of long division.

432 ÷ 15 = 28 r 12

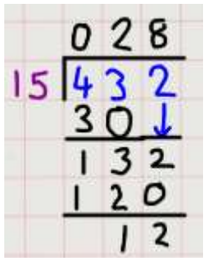
Step one: Children will put the calculation into the grid and list their multiples of the divisor.



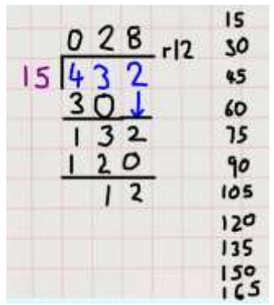
Step 2: Start with the hundreds. The divisor doesn't divide into 4 so combine the 4 hundred with the 3 tens (430). Use the multiples of 15 to calculate the nearest multiple. Two x 15 is 30. Record this underneath, put the 2 on the top then subtract.



Step 3: The divisor does divide into 13 so combine the 13 tens with the 2 ones (132). Use the multiples of 15 to calculate the nearest multiple. 8 x 15 is 120. Record this underneath, put the 8 on the top then subtract.



Step 4: The number left is your remainder, record this with your answer 432 ÷ 15 = 28 r 12



Children are expected to interpret non-integar answers by expressing results as fractions (432÷15 = $28\frac{12}{15}$ = $28\frac{4}{5}$), decimals (432÷15 = 28.8) or by rounding (432÷15 = 28.8 ≈ 29 cars) according to the context.