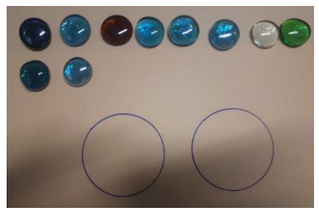
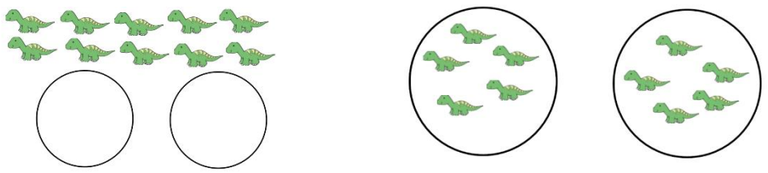
Cottingham Cof E Primary School Calculation Policy- Division

Foundation Stage

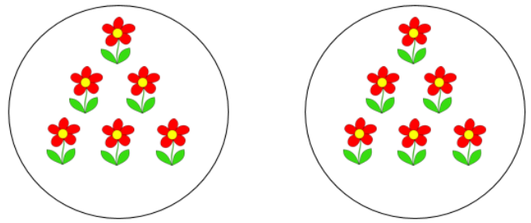
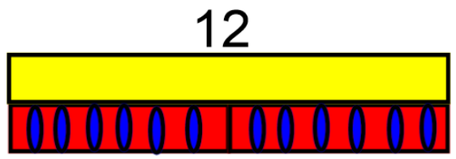
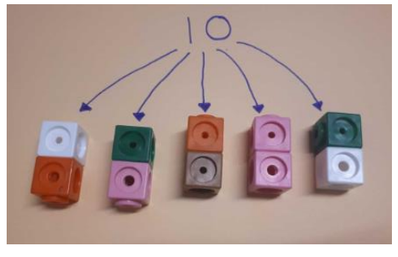
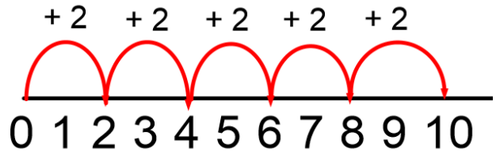
Key Vocabulary: *sharing, halving, number patterns*

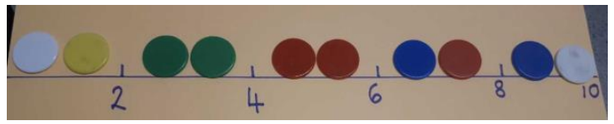
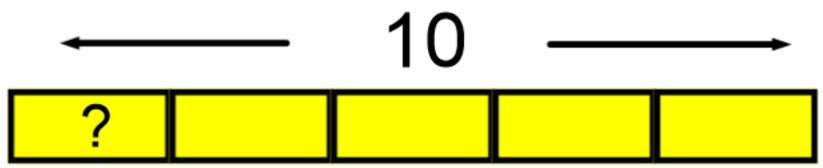
Objective & Strategy	Concrete	Pictorial	Abstract
To begin to divide by sharing.	Children will use a range of resources to share concrete resources to begin to demonstrate understanding. Children will start with an even number and will need to share this out equally in a given group. e.g. 10 ÷ 2 = 5  	Children will understand equal groups and share items out in play and problem solving. They will count in 2s and 10s and later in 5s. **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. 	Children will begin to experiment with writing division number sentences using the division symbol. 10 ÷ 2 = 5

Cottingham Cof E Primary School Calculation Policy- Division

Year 1

Key Vocabulary: *division, dividing, grouping, sharing, doubling, halving, array, number pattern, equal grouping, equal sharing*

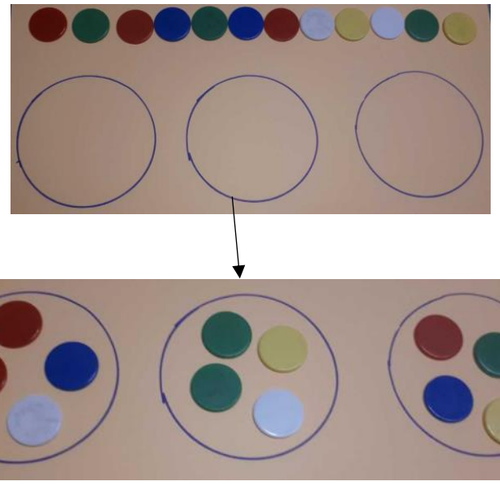
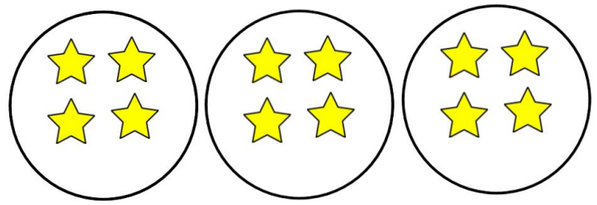
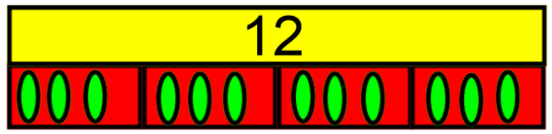
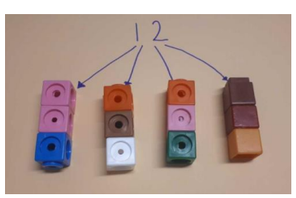
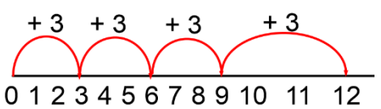
Objective & Strategy	Concrete	Pictorial	Abstract
To divide by sharing To half a number up to 20.	Children will use concrete resources, including uni-fix cubes to share into equal groups. Children will also be able to half a number up to 20 by sharing into equal groups.   **Stem Sentence:** I know there are **2** groups so I can share **12** counters which will equal **6** in each group.	Children will 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 ÷ 2 = 6 	Children will be introduced to word problems to solve division problems. 6 sweets are shared between 2 people. How many do they have each? 12 ÷ 2 = 6 **Stem Sentence:** I know **12** divided equally between **2** groups' equals **6.**
To divide by grouping.	Children will begin to solve division problems, which require sorting objects and quantities into 2s, 4s, 5s and 10s. Children will use concrete resources such as cubes, counters or objects to aid understanding. 10 ÷ 5 = 2 	Children will use number lines to show grouping. 10 ÷ 2 = 5  Children will also experiment 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	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

	 2 4 6 8 10	 10 ?	

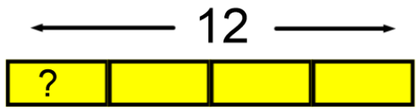
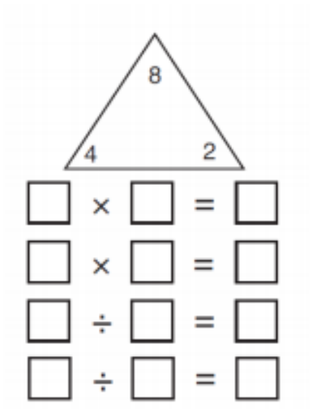
Cottingham Cof E Primary School Calculation Policy- Division

Year 2

Key Vocabulary: *multiplication, multiply, multiplied by, multiple, grouping, doubling, array, row, column, groups of, times once, twice, three times … ten times, repeated addition, one each, two each, three each … ten each, equal groups of, multiplication table, multiplication fact.*

Objective & Strategy	Concrete	Pictorial	Abstract
To divide by sharing.	Children will use a range of concrete resources, including cubes to share objects and quantities into equal groups. I have 12 cubes, can you share them equally into 3 groups? 	Children will use pictures and shapes to share quantities. 12 ÷ 3 = 4  Children will also be able to use the bar model to show and support their understanding. e.g. 12 ÷ 4 = 3 	Children will be writing division number sentence using the divide symbol. 12 ÷ 3 = 4 12 ÷ 4 = 3
To divide by grouping (repeated addition)	Children will begin to solve division problems, which require sorting objects and quantities into 2s, 4s, 5s and 10s. Children will use concrete resources such as cubes, counters or objects to aid understanding. 	Children will use number lines to show grouping  Children will 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.	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

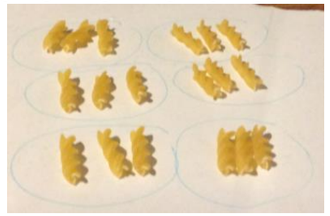
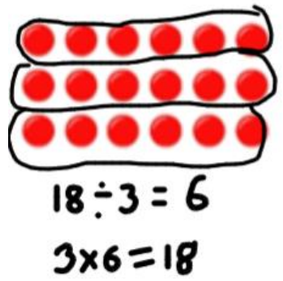
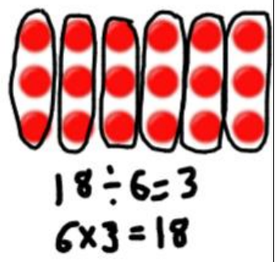
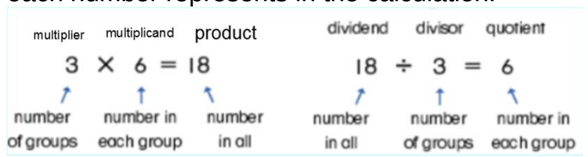
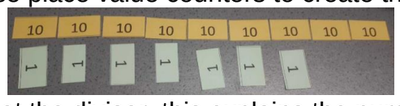
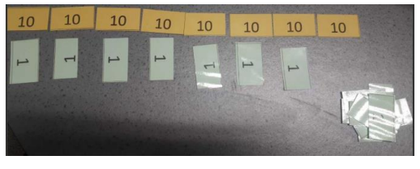
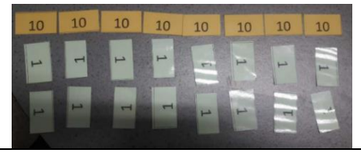
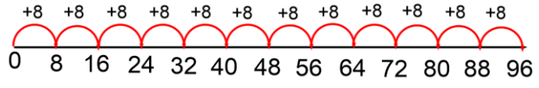
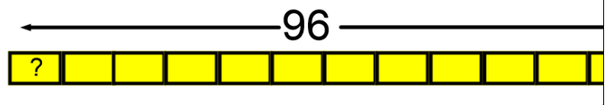
Cottingham Cof E Primary School Calculation Policy- Division

			
To use related multiplication and division facts using the inverse for the 2, 3, 5 and 10 times table.	Children will use concrete resources, including cubes 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 	Children will use pictorial representations to solve missing number facts that demonstrate related facts. 	Children will show 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

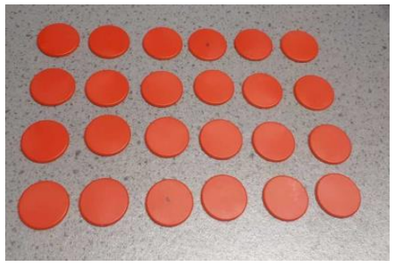
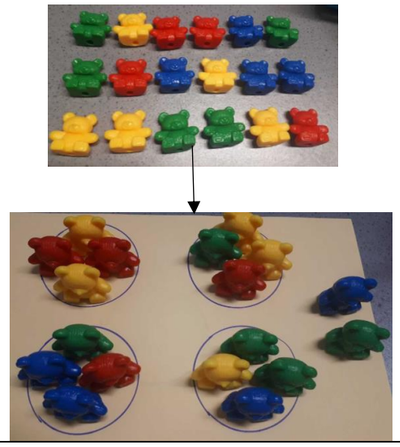
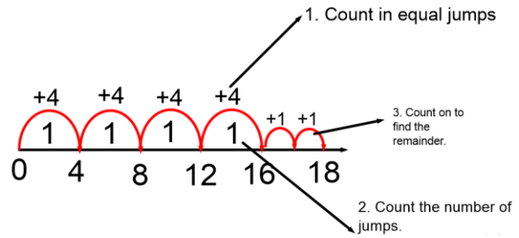
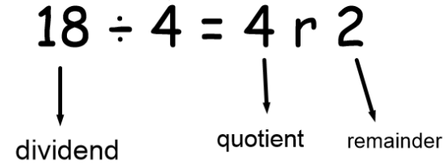
Cottingham Cof E Primary School Calculation Policy- Division

Year 3

Key Vocabulary: *groups of 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, halving, array row, column, number patterns, division fact*

Objective	Concrete	Pictorial	Abstract
To recall multiplication and division facts for multiplication tables up to 12x 12.	Children continue to deepen their understanding of the link between multiplication and division and use physical objects to find related facts. 3 x 6= 18 18 ÷ 3 = 6 6 x 3 = 18 18 ÷ 6 = 3  	Children represent an array pictorially then find the associated multiplication and division facts by sorting into equal groups.  	Children apply their 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 They use associated vocabulary correctly and know what each number represents in the calculation. 
To using grouping to divide (repeated addition)	Children will use concrete resources, including place value counters to divide by grouping. **96÷8=12** **Step 1:** Use place value counters to create the dividend.  **Step 2:** Look at the divisor, this explains the number of groups you will need. E.g. 8. The children will need to exchange 1 ten for 10 ones.  **Step 3:** Children will need to share out the remaining number so each group is equal. 	Children will continue to use repeated addition on the number line but will work with increasingly large numbers. 96 ÷ 8 = 12 Children will count on from in 8s from 0 until they reach 96.  Children will also continue to use the bar model to support their understanding. 	There are 96 footballs. Each player needs 8 footballs. How many players are there? 96 ÷ 8 = 12 There are 96 footballs. Each player needs 12 footballs. How many players are there? 96 ÷ 12 = 8 **How many groups 8 are in 96?** **How many groups of 12 are in 96?**

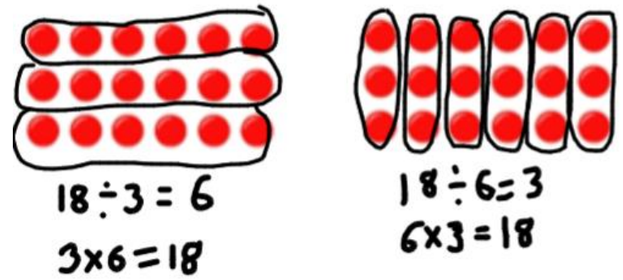
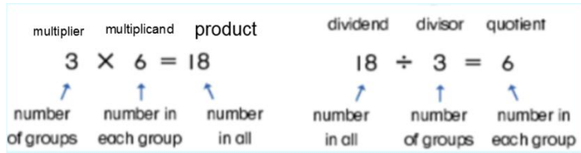
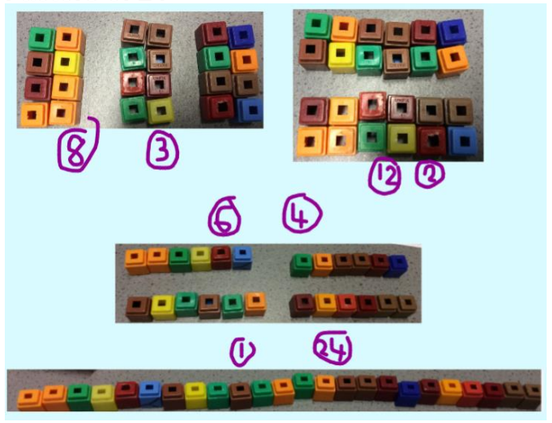
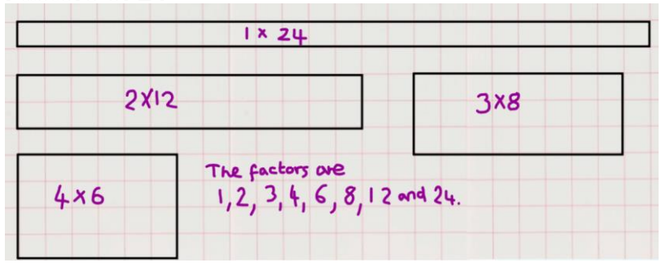
Cottingham Cof E Primary School Calculation Policy- Division

To use arrays to divide.	Children will 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	Children will 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  **STEM:** I know **24 ÷ 6 = 4** because **6** groups of **4** equals **24**	Children will 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 divide with whole numbers and represent remainders.	Children will use a range of concrete resources to divide between groups and see what is left over. 18 ÷ 4 = 4 r 2 	Children will use a number line to jump forward in equal jumps. They will then see how many more they need to jump to find the remainder. 18 ÷ 4 = 4 r 2 	Children will complete written division number sentences using the division symbol and r to represent the remainder. 

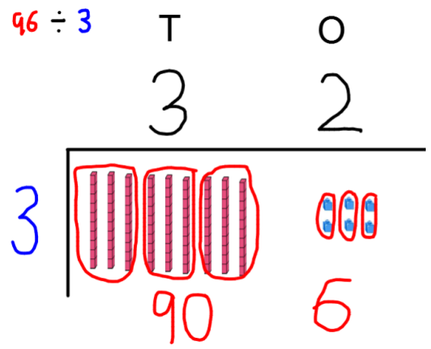
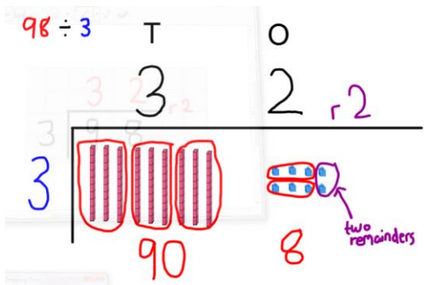
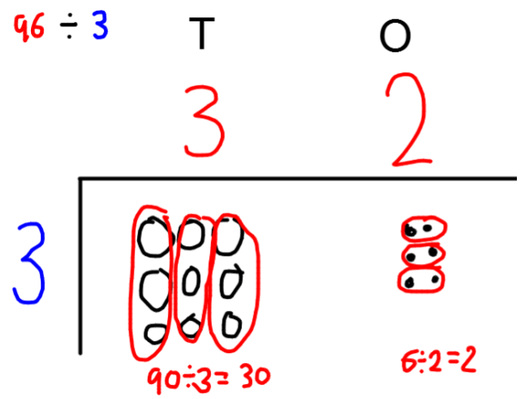
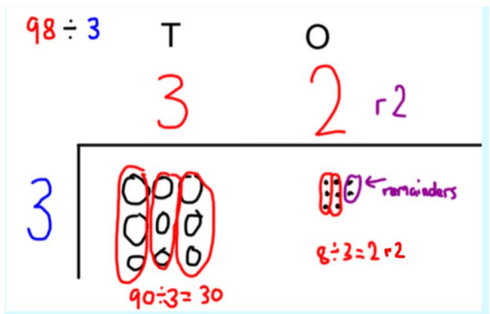
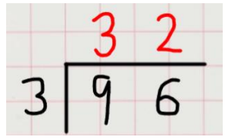
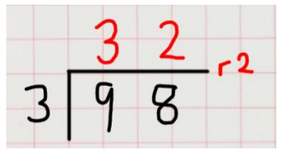
Cottingham Cof E Primary School Calculation Policy- Division

Year 4

Key Vocabulary: *factors, multiples, groups of, share, share equally, equal groups, division, divide, divided by, divided into, left, left over, remainder, array.*

Objective & Strategy	Concrete	Pictorial	Abstract
To recall multiplication and division facts for multiplication tables up to 12x 12.	Children continue to deepen their understanding of the link between multiplication and division and use physical objects to find related facts. 3 x 6= 18 18 ÷ 3 = 6 6 x 3 = 18 18 ÷ 6 = 3  	Children represent an array pictorially then find the associated multiplication and division facts by sorting into equal groups. 	Children apply their 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 They use associated vocabulary correctly and know what each number represents in the calculation. 
To recognise and use factor pairs and commutativity in mental calculations.	Children use physical objects to create arrays to support their understanding of factors. **Factors of 24** 	Children investigate finding all factors of a number by drawing arrays. **Factors of 24** 	Children 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
To use a formal written method of short division (bus stop method).	Children represent division calculations using concrete materials such as base 10 and place value counters. The children partition the dividend and put inside the bus stop then divide each part by the divisor. The quotient is then recorded on the top line.	Children represent division calculations using informal jottings and pictorial representations.	In Year 4 children divide numbers up to 3 digits by a 1 digit numbers with exact answers. The children are introduced to the bus stop method as a formal written method.

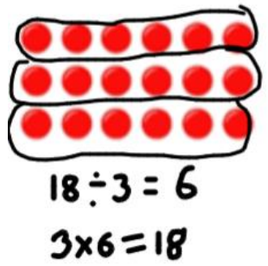
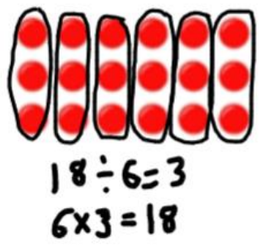
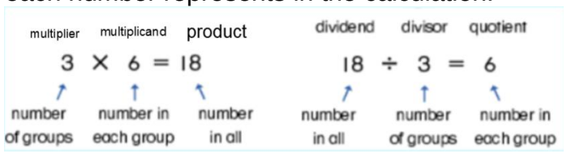
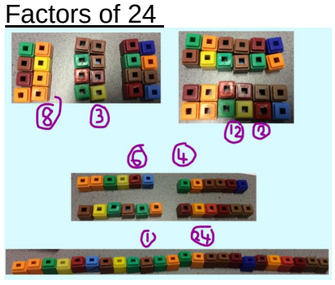
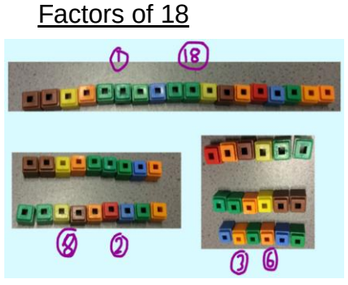
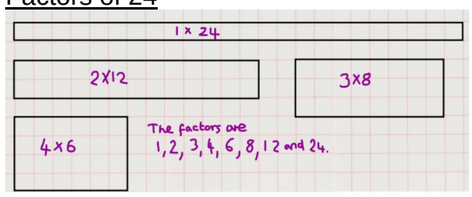
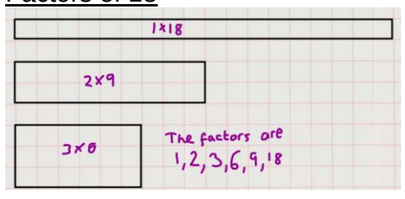
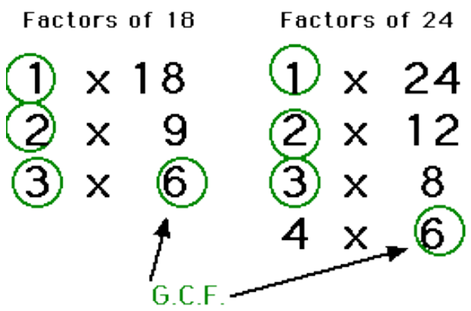
Cottingham Cof E Primary School Calculation Policy- Division

2/ 3 digit ÷ 1 digit number (exact answers- no remainders) 2 or 3 digit divided by a 1 digit number (simple remainders)	 They begin to explore calculations involving simple remainders. **98÷ 3 = 32 r2** 	 They begin to explore calculations involving simple remainders. **98÷ 3 = 32 r2** 	**96 ÷ 3= 32**  Once children have a secure understanding, they begin to understand how to record calculations with simple remainders. **98÷ 3 = 32 r2**  Children apply their knowledge of division to word problems. *Arron has 77 seeds. He plants 4 seeds in each plant pot. How many pots does he need?*

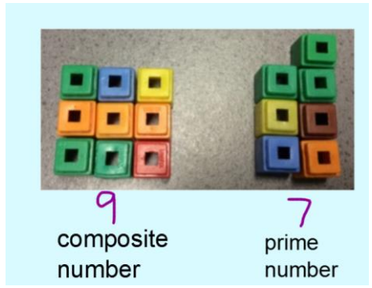
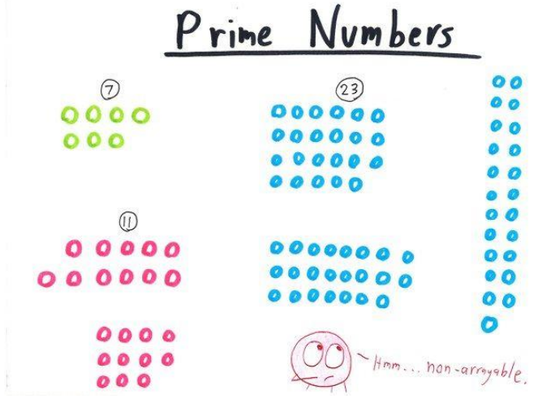
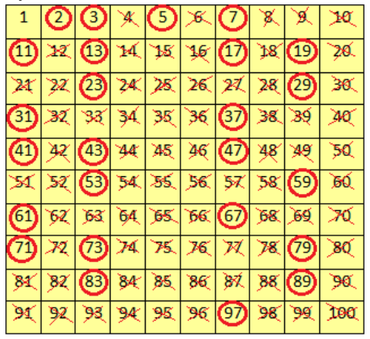
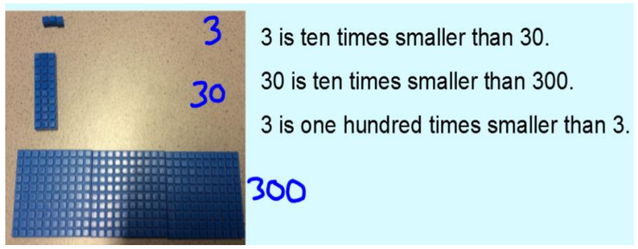
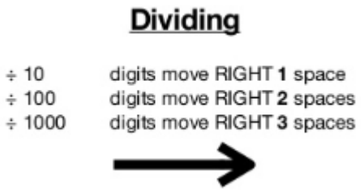
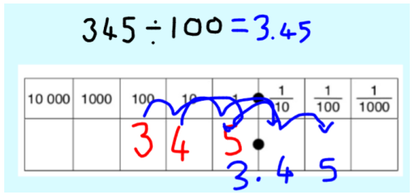
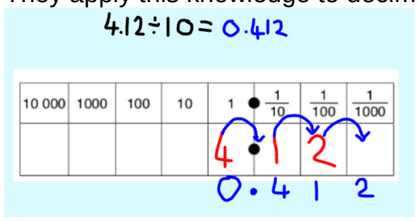
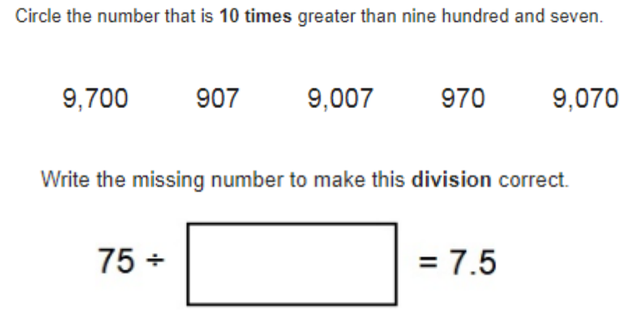
Cottingham Cof E Primary School Calculation Policy- Division

Year 5

Key Vocabulary: *factors, multiples, groups of, share, share equally, equal groups, division, divide, divided by, divided into, left, left over, remainder, array, prime numbers, composite numbers.*

Objective & Strategy	Concrete	Pictorial	Abstract
To recall multiplication and division facts for multiplication tables up to 12x 12.	Children continue to deepen their understanding of the link between multiplication and division and use physical objects to find related facts. 3 x 6= 18 18 ÷ 3 = 6 6 x 3 = 18 18 ÷ 6 = 3  	Children represent an array pictorially then find the associated multiplication and division facts by sorting into equal groups.  	Children apply their 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 They 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.	Children 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.	Children 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.	Children 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**. ☐☐☐

Cottingham Cof E Primary School Calculation Policy- Division

To establish whether a number up to 100 is prime and recall prime numbers up to 19.	Children find prime numbers and composite (non-prime numbers) by using arrays. They understand that composite numbers form arrays and prime numbers cannot be arranged into arrays.  	Children use jottings and pictorial representations to investigate composite and prime numbers.  	Children use their knowledge of multiples and factors to find the prime numbers up to 100. They eliminate numbers that have factors other than 1.They can recall all prime numbers up to 19. 
To divide whole numbers and those involving decimals by 10, 100 and 1,000	Children use resources to understand what 10, 100 and 1000 times bigger looks like.  	Children use place value grids to divide numbers by 10, 100 and 1000s. They understand the movement of the digits on the place value grid.   They apply this knowledge to decimal numbers.  	Children apply their 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 They apply their understanding to more complex number puzzles and word problems.  *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?*

Cottingham Cof E Primary School Calculation Policy- Division

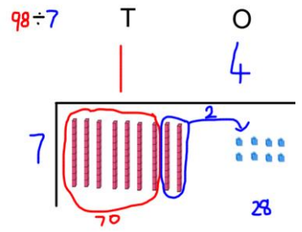
To use a formal written method of short division (bus stop method).

Numbers up to 4 digits ÷ 1 digit number (with remainders)

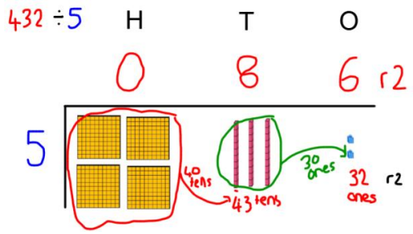
Children represent division calculations using concrete materials such as base 10 and place value counters.

The children partition the dividend and put inside the bus stop then divide each part by the divisor. The quotient is then recorded on the top line. The children work with numbers that involve remainders.

98 ÷ 7= 14

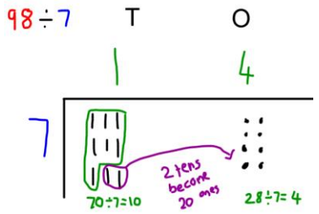


432÷5 = 86 r2

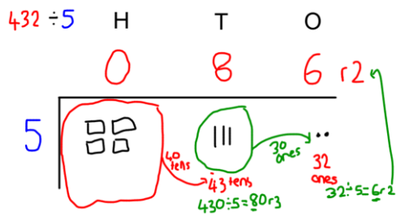


Children represent division calculations using informal jottings and pictorial representations. The children recognise remainders.

98 ÷ 7= 14



432÷5 = 86 r2



In Year 5 children divide numbers up to 4 digits by a 1 digit number, including calculations involving remainders. The children continue to use the bus stop method as a formal method of written calculation.

98 ÷ 7 becomes

$$\begin{array}{r} 1\ 4 \\ 7\overline{)\,9\ 8} \end{array}$$

Answer: 14

432 ÷ 5 becomes

$$\begin{array}{r} 8\ 6\ r2 \\ 5\overline{)\,4\ 3\ 2} \end{array}$$

Answer: 86 remainder 2

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

Children apply their knowledge using word problems and number puzzles.

A spoonful is **5ml**.

How many spoonfuls can you get from this bottle?

Write in the missing digit.

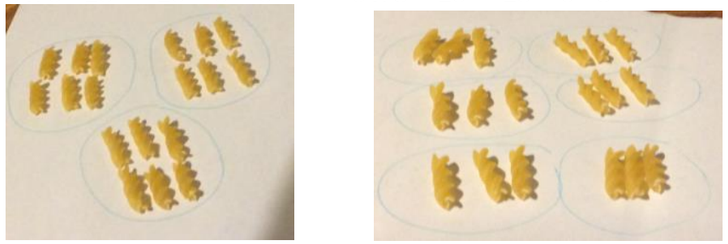
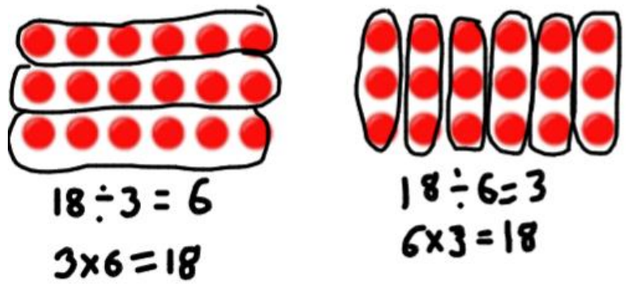
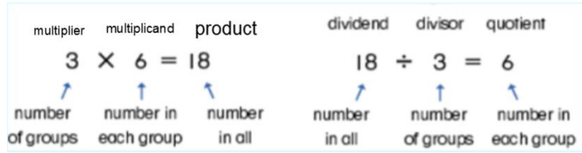
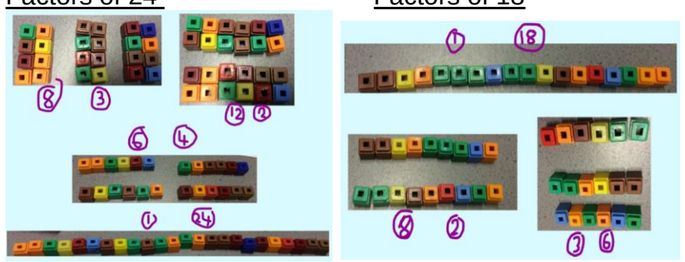
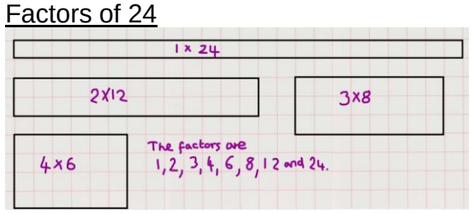
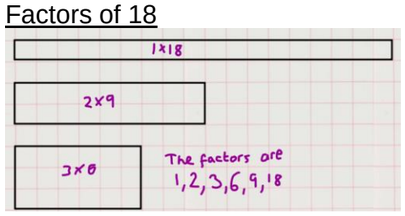
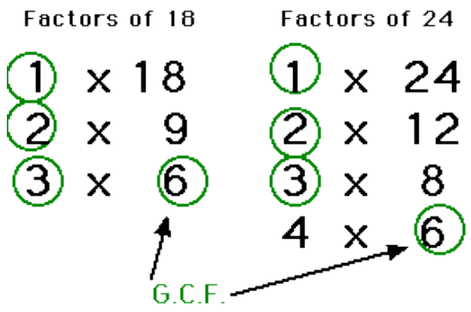
The answer **does not** have a **remainder.**

$$\begin{array}{r} 2\ 6 \\ 3\overline{)\,\square\ 8} \end{array}$$

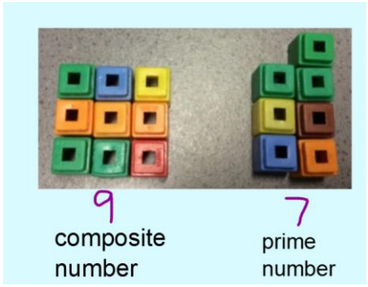
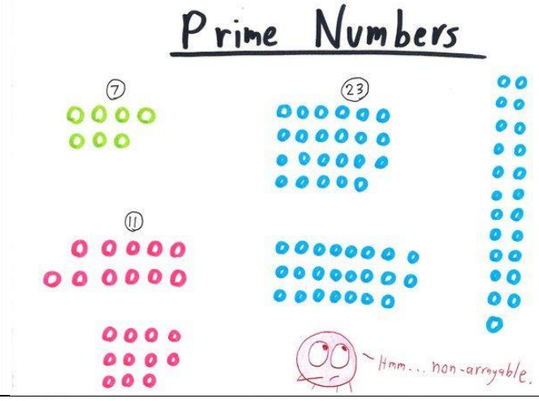
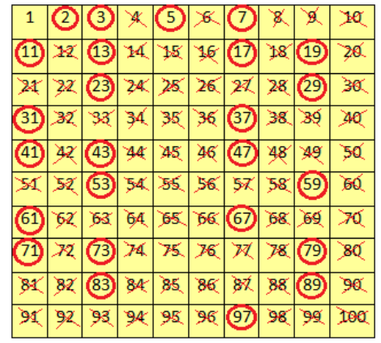
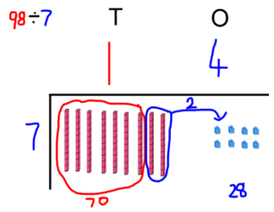
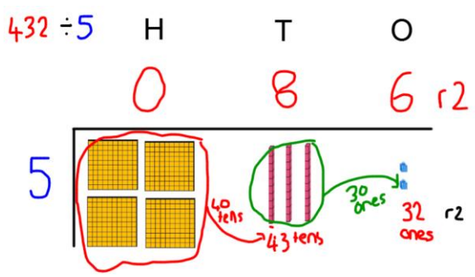
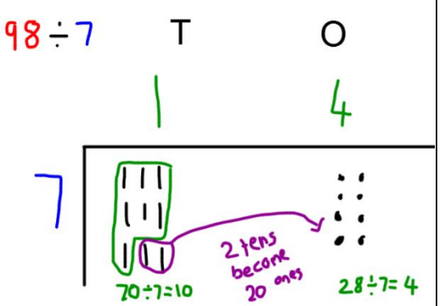
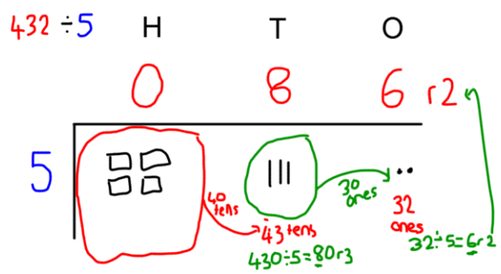
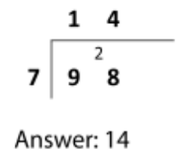
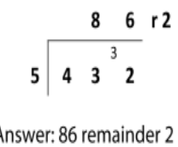
Cottingham Cof E Primary School Calculation Policy- Division

Year 6

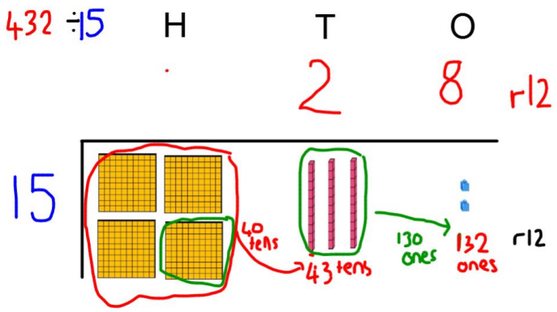
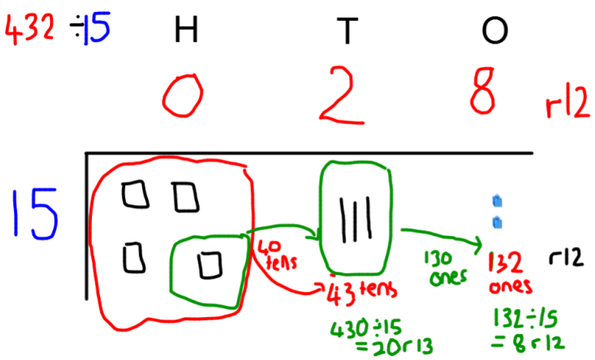
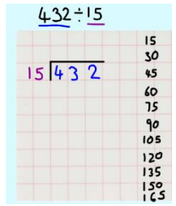
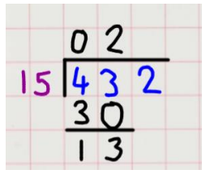
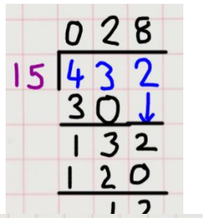
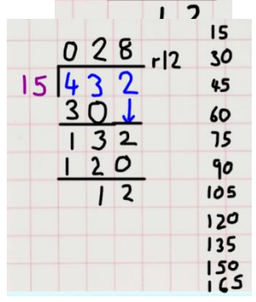
Key Vocabulary: *factors, multiples, groups of, share, share equally, equal groups, division, divide, divided by, divided into, left, left over, remainder, array.*

Objective & Strategy	Concrete	Pictorial	Abstract
To recall multiplication and division facts for multiplication tables up to 12x 12.	Children continue to deepen their understanding of the link between multiplication and division and use physical objects to find related facts. 3 x 6= 18 18 ÷ 3 = 6 6 x 3 = 18 18 ÷ 6 =3 	Children represent an array pictorially then find the associated multiplication and division facts by sorting into equal groups. 	Children apply their 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 They use associated vocabulary correctly and know what each number represents in the calculation. 
To identify common factors.	Children 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.	Children investigate finding all factors of a number by drawing arrays. They then find factors which are the same in 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.	Children use their knowledge of 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.

Cottingham Cof E Primary School Calculation Policy- Division

To establish whether a number up to 100 is prime and recall prime numbers up to 19.	Children find prime numbers and composite (non-prime numbers) by using arrays. They understand that composite numbers form arrays and prime numbers cannot be arranged into arrays.  	Children use jottings and pictorial representations to investigate composite and prime numbers.  	Children use their knowledge of multiples and factors to find the prime numbers up to 100. They eliminate numbers that have factors other than 1.They can recall all prime numbers up to 19. 
To use a formal written method of short division (bus stop method). Larger numbers ÷ 1 digit number (involving remainders)	Children represent division calculations using concrete materials such as base 10 and place value counters. The children partition the dividend and put inside the bus stop then divide each part by the divisor. The quotient is then recorded on the top line. The children work with numbers that involve remainders. **98 ÷ 7= 14**  **432÷5 = 86 r2**  	Children represent division calculations using informal jottings and pictorial representations. The children will recognise remainders. **98 ÷ 7= 14**  **432÷5 = 86 r2**  	In Year 6 children divide larger numbers by a 1 digit number with calculations involving remainders. The children continue to use the bus stop method as a formal method of written calculation. 98 ÷ 7 becomes  Answer: 14 432 ÷ 5 becomes  Answer: 86 remainder 2 Children are expected to interpret non-integar 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. Children apply their knowledge using word problems and number puzzles. *Sharon buys a pack of 24 cans of lemonade for £6. How much does each can cost?* Write the missing number. 70 ÷ ☐ = 3.5 Write the missing number in each calculation. 25 ÷ ☐ = 3 remainder 4

Cottingham Cof E Primary School Calculation Policy- Division

To use a formal written method of long division (bus stop method). Divide larger numbers ÷ 2 digit numbers (involving remainders)	Children represent division calculations using concrete materials such as base 10 and place value counters. The children partition the dividend and put inside the bus stop then divide each part by the divisor. The quotient is then recorded on the top line. 	Children represent division calculations using informal jottings and pictorial representations. 	The children use the bus stop method as a formal method of written calculation. They use their understanding of the pictorial and concrete stages to understand the value of each number. **432 ÷ 15 = 28 r12.**  **Step one:** Children will put the calculation into the bus stop 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 r12.  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.