



Calculation Policy

Division

Objectives relating to division by year group

Pre-requisites:

Number: pupils need to be able to read, write and order numbers to at least 20

Representations: Subitise small groups of objects (i.e. can say how many there are without needing to count each individual object.)

- Year 1 – Solve one-step problems involving division, by calculating the answer using concrete objects, pictorial representations and arrays.
- Year 2 – calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (\times), division (\div) and equals ($=$) signs
- Year 3 - write and calculate mathematical statements for multiplication and division using the multiplication tables that they know,
- Year 4 - recall division facts for multiplication tables up to 12×12
- Year 5 - divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context. Divide whole numbers and those involving decimals by 10, 100 and 1000
- Year 6 - divide numbers up to 4 digits by a two-digit whole number using written methods of both short and long division, interpreting remainders as whole number remainders, fractions and decimals.

Vocabulary:

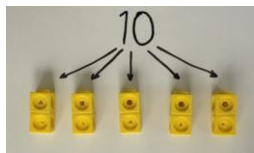
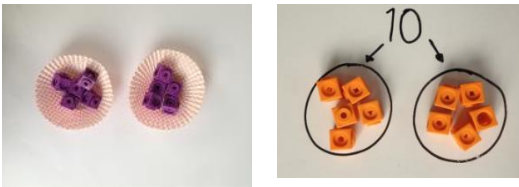
share groups of divide division quotient dividend
factors halve remainder divisor equal



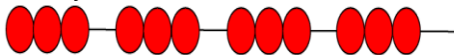
Concrete

Sharing

Sharing objects into groups



How many 3s make 12



Pictorial

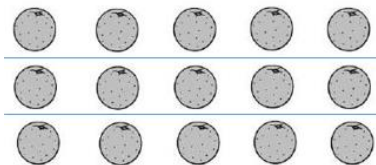
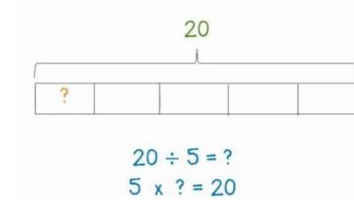
Sharing

Children use pictures or shapes to share quantities.

$$8 \div 2 = 4$$



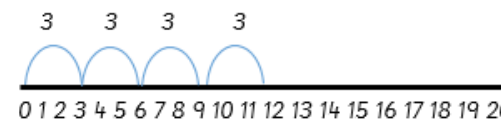
Think of the bar as a whole. Split it into the number of groups you are dividing by and work out how many would be within each group.



Abstract

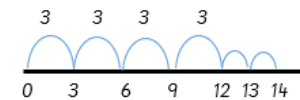
Division using a numbered number line

Use a number line to show jumps in groups. The number of jumps equals the number of groups



Counting on in equal groups of.

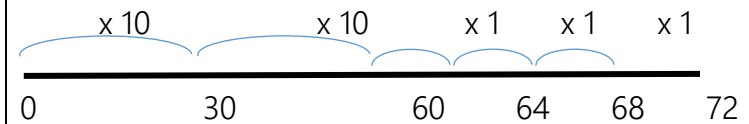
$$14 \div 3 = 4 \text{ r } 2$$



Chunking on a number line

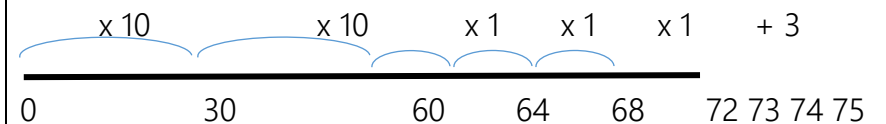
$$72 \div 3 =$$

How many 3s in 72?



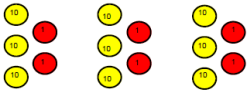
With remainders

$$75 \div 3 =$$

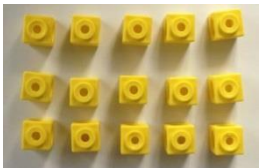




$$96 \div 3 = 32$$



Arrays



Link division to multiplication by creating an array and thinking about the number sentences that can be created.

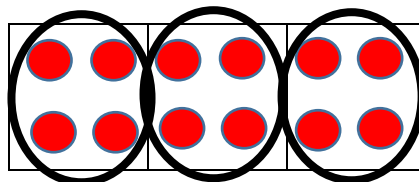
Eg $15 \div 3 = 5$ $5 \times 3 = 15$

Draw an **array** and use lines to split the array into groups to make **multiplication and division sentences**.



Draw dots and group them to divide an amount and clearly show a **remainder**

Students can continue to use drawn diagrams with dots or circles to help them divide numbers into equal groups.



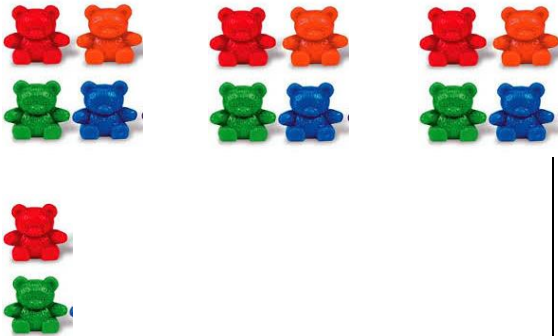


$$15 \div 5 = 3 \quad 3 \times 5 = 15$$

Division with a [remainder](#)

$$14 \div 3 =$$

Divide objects between groups and see how many are left over



Encourage them to move towards counting in multiples to divide more efficiently.

[Rounding up and down](#)

Children need to be able to decide what to do after division and round up or down accordingly. They should make sensible decisions about rounding up or down after division. For example $62 \div 8$ is 7 remainder 6, but whether the answer should be rounded up to 8 or rounded down to 7 depends on the context.

e.g. I have 62p. Sweets are 8p each.
How many can I buy?

Answer: 7 (the remaining 6p is not enough to buy another sweet)

Apples are packed into boxes of 8.
There are 62 apples. How many boxes are needed?

Answer: 8 (the remaining 6 apples still need to be placed into a box)

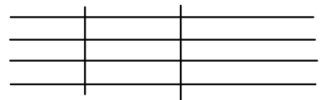


Short Division

$$96 \div 3$$



$$42 \div 3 =$$



Start with the **most significant digit**, we are dividing 40 into three groups. Put 1 ten in each group and have 1 ten left over.

Short Division (the **divisor** is 1 digit and the **quotient** is calculated without intermediate working out)

Begin with divisions that divide equally with no remainder.

	2	1	8	
4	8	7	32	

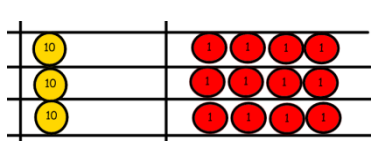
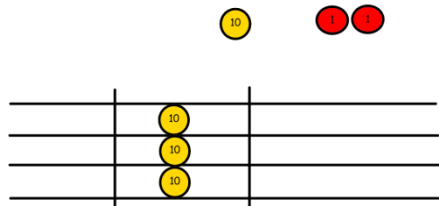
Move onto divisions with a **remainder**.

	0	8	6	r	2
5	4	43	32		

Moving into **mixed number** answers

$$496 \div 11 = 45 \frac{1}{11}$$

			4	5	r	1
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We exchange this ten for ten ones

and then share the ones equally among the groups.

We look how much is in each group so the quotient is 14

1	1	4	9	56		
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Move onto decimal places to divide the total accurately.

	2	1	9	.	2	5
4	8	7	37			

$$877 \div 4 = 219.25$$

Long division (i)

(The divisor has 2 or more digits and intermediate workings are required)

This method applies – and builds upon- the child's knowledge of place value and multiples.



			0	3	2												
1	6		5	51	32												
										1	0	+		6	=	1	6
										2	0	+	1	2	=	3	2
										3	0	+	1	8	=	4	8
										4	0	+	2	4	=	6	4

It is good practice to **leave a space** between the digits in the **dividend**:

			0	3	2												
1	6		5	5	1	3	1										
										1	0	+		6	=	1	6
										2	0	+	1	2	=	3	2
										3	0	+	1	8	=	4	8
										4	0	+	2	4	=	6	4

[Long division \(ii\)](#)



This method applies – and builds upon- the child’s knowledge of factors. It is not appropriate if the divisor is a prime number.

									1	x	1	6		
1	6	5	1	2					2	x	8			
									4	x	4			
			2	5	6									
		2	5	11	12									
			0	3	2									
		8	2	25	16									

Step 1: $512 \div 2 = 256$

Step 2: $256 \div 8 = 32$

Long division (iii): formal method

(The divisor has 2 or more digits and intermediate workings are required)

			2	8	r	1	2	
1	5	4	3	2				
		3	0	0		x	2	0
		1	3	2				
		1	2	0		x	8	
			1	2				



Answer as a [mixed number](#)

						4		
			2	8		5		
1	5	4	3	2				
		3	0	0		x	2	0
		1	3	2				
		1	2	0		x	8	
			1	2				
			1	2	=	4		
			1	5		5		

Answer as a [decimal](#)

			2	8	.	8			
1	5	4	3	2	.	0			
		3	0	0	.	0	x	2	0
		1	3	2	.	0			
		1	2	0	.	0	x	8	

