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## CALCULATION PROGRESSION POLICY 2022

+	ADDITION YR-6 at The Craylands								
+	<u>Skill:</u>	<u>Concrete:</u>	Pictorial:	Abstract:					
YR	Subitise (recognise quantities without counting) up to 5 Understand the composition of each number up to 10 Automatically recall some number bonds to ten Spot connections (patterns, relationship) and share with adults and peers	<text><image/><image/><image/></text>	Children are encouraged to experiment with and make their own pictorial representations of adding and counting:	Learn addition facts for each number to 5 and 10. Introduce facts for 6, 7, 8, 9.Image: Image: Im					



+	<u>Skill:</u>	Concrete:	Pictorial:	Abstract:	
	TO + O TO + tens TO + TO Add three 1 digit numbers [Show addition of two or more numbers can be done in any order.]	Pupils use concrete objects alongside place value charts, part-whole models, ten frames and numberlines:	Efficient jumps drawn on marked and blank number line (progressing to mental jumps): Bridging ten- apply number bond to ten knowledge: 8+7=8 10 15	Informal mental jottings: 35 + 47 = 82 47 + 30 = 77 77 + 3 = 80 80 + 2 = 82	
		Three 1 it numbers we addition we or more $7+6+3=16$ 10 First when adding onto TC ones:	First when adding onto TO might need to count on in ones:	Partitioning 35 + 47 = 82 40 + 30 = 70 7 + 5 = 12	
		done in any order.]	Base ten: 58 + 30 = 88	<b>35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50</b> Progress to applying number bond knowledge and jumping to multiples of ten: +2 $+3$	expanded written method (vertical): 47 + 35 = 82 40 + 7
Y 2			Base ten and place value charts with re-	38  40  43 [Also jumps can be in 10s and then1s] $47+35=82$	$\frac{30 + 5}{70 + 12}$ Recording addition in columns supports place value and prepares for formal written methods with
2		grouping: 38+ 23 =61	$\frac{1}{47} + 3 + 2}{1}$ $\frac{1}{47} + 2}{1}$	<i>larger numbers.</i> Recall and use addition facts to 20 fluently. Derive and use related facts up to 100.	
					Practise + to 20 to derive facts such as using $3 + 7 = 10$ to calculate $30 + 70 =$ 100, 100 - 70 = 30 and $70 = 100 - 30$ . Check calculations, including by adding
		12 + 15= 27 Numicon: 12		numbers in a different order to check addition and using inverse relationship Establishes commutativity and associativity of addition. <b>Part + part + part = whole</b>	
		15		$7 + 4 + 9 = 20$ $\downarrow \qquad \downarrow \qquad$	







	<b>SUBTRACTION</b>						
-	YR-6 at The Craylands						
-	<u>Skill:</u>	<u>Concrete:</u>	Pictorial:	Abstract:			
	Automaticall y recall number bonds up to 5 (including	Physically taking away and removing objects from a whole (ten frames, Numicon, Rekenreks, cubes and other items such as beanbags could be used). 4-3=1	Children are encouraged to experiment with and <b>make their</b> <b>own pictorial representations</b> of taking away and finding the difference.	Learn subtraction facts for each number to 5 and 10. Introduce facts for 6, 7, 8, 9.			
	subtraction facts)		Children encouraged to draw the concrete resources they are using and cross out the correct amount:	They begin to use – symbol and read/write subtraction number sentences (alongside concrete and pictorial representations.)			
Y	Compare quantities up to 10 in different contexts, recognising	Children start to understand that subtraction means finding the difference and can use cubes, counters, numicon, cuisennare and Rekenrek to find it:	These mathematical graphics offer a conceptual link between practical exploration and symbolic representation. Encouraging children to talk about their recording allows them to rehearse their ideas and provides an insight into individuals' mathematical understanding.	Subtraction: 8-3 = 5 Minuend Subtrahend Difference			
ĸ	when one quantity is greater than	Counting back (using number tracks) children	Children draw and paint <b>part-whole models with missing parts</b> :	They are encouraged to develop a mental picture of the number system in their heads to use for calculations.			
	Have a deep understandi ng of number to 10, including the composition of each	start with 6 and count back 2. 6 -2 =4 1 2 3 4 5 6 7 8 9 10 They begin to count back in ones and twos using objects, cubes and Rekenreks. Link to addition. Use PPW model to model the inverse.					







![](_page_11_Figure_0.jpeg)

	<b>MULTIPLICATION</b>						
X	YR-6 at The Craylands						
x	<u>Skill:</u>	<u>Concrete:</u>	Pictorial:	Abstract:			
Y R	Explore double facts and how quantities can be distributed evenly Know some double facts (up to 10) Represent patterns, including evens	Use concrete resources and real objects and contexts to develop understanding: Numicon, Rekenrek, counters, ten frames, bead strings., number tracks and number lines How many socks in three pairs?	Show and encourage children to make own symbolic (pictorial) recordings: 3 pairs, 2 socks in each pair: Use number tracks/lines to spot even numbers: 0 2 4 6 8 10 12 14 16 18 20 22 24	Show children how to record doubles in addition sentences: 2 + 2 = 4 Introduce idea of repeated addition; 2 and 2 and 2 is			
Y R 1 / 2	Yr1: Solve one- step problems using concrete objects, pictorial representations and arrays (with the support of the teacher) Count in steps of 2, 5 and 10 Yr2: Calculate statements for multiplication within the 2x, 5x, 10x and 3x multiplication tables and write them using the multiplication and equals signs. [Show multiplication of two numbers can be done in any order.]	Use concrete resources and real objects and contexts to develop understanding:	Encourage children to draw equal groups of:	In year 1 children count in steps of 2, 5 and 10 Children represent multiplication as repeated addition: 5 + 5 + 5 + 5 = 20 They are not expected to record multiplication using x symbol. In Year 1, children use concrete and pictorial representations to solve problems. In Year 2, children are introduced to the multiplication symbol: $4 \times 5 = 20$ $5 \times 4 = 20$ groups of= Multiplication: $6 \times 3 = 18$ Factor Product			

x	<u>Skill:</u>	<u>Concrete:</u>	Pictorial:	<u>Abs</u> t	tract	<u>t:</u>			
	Yr 3: Write/calculate statements	Use concrete resources to develop understanding of new multiplication facts/	<b>Draw</b> number lines to show multiplication, moving to more abstract jumps on a blank number line:	Expan metho	ded w od:	vritter	n mu	ltiplication	
	multiplication tables that they	e.g. Numicon:	$3 \times 4 = 12$		н	т	0		
	know (progressing to <b>formal</b> written		1000010000100001			3	4		
	methods). TO x O	e.g. Cuissenaire:	+4 +6 +6	×			5		
	(multiplier is 2/3/4/5/8/10)	If pink = 4 and light green = 3	<u>สายานนั้นและและและและและและ</u>			2	0	(5 × 4)	
	Yr4:		***************************************	+	1	5	0	(5 × 30)	
	written layout:		$\sim$		1	7	0		
	TO x O HTO x O	Use base ten/ place value counters and	0 4 8 12	Forma	l shoi	rt mul	tiplic	ation meth	od:
		place value charts to introduce and	$4 \times 15 =$		н	Т		0	
Y		represent: e.g. 245 x 4 =	0 10 20 Bo 40 45 50 55 60		2	4		5	
R 3		Hundreds Tens Ones	10×4 5×4	×	-	-		4	
/			40 60		-	-	-	_	
4			Represent base ten or the place value counters						
			pictorially in drawn place value charts; remembering to	Use m Practise	ental <i>menta</i>	metho	ods: Ids an	d extend this to	o HTO
			$4 \times 15 = 6 \times 23 =$	number 600 into	s to de 600 ÷	rive fact 3 = 200	s, for ).	example 200 ×	: 3 =
			10s 1s 100s 10s 1s	or to lin method	k with F s:	Place Va	alue C	hart concrete	metrioa
				×	2	20	6		
		Hundreds Tens Ones		5	1	00	30	= 130	
			6 10 200000	Yr3: Ro 4, 6 and	Yr3: Recall and use multiplication facts for the 4, 6 and 8 multiplication tables.			the 3,	
				Yr 4: Recall r Use pla mentally Recogn mental	nultiplic ce valu /, incluc ise/use calculat	ation fa e, know ding x b factor p tions.	cts to n & de y 0/1; pairs a	12 × 12. erived facts to x 3 numbers. and commutativ	multiply vity in

![](_page_14_Figure_0.jpeg)

	DIVISION						
•	YR-6 at The Craylands						
•	<u>Skill:</u>	<u>Concrete:</u>	Pictorial:	Abstract:			
Y R	Explore how quantities can be distributed evenly:	Use concrete and real objects in real life contexts: Share 8 buns between two people. 6 beanbags shared between 2 hoops:	Children are encouraged to record concrete representations pictorially in their own way: e.g.	Children should not be introduced to the division symbol in reception or year 1. Children may be introduced to the words share and equally.			
Y R 1 / 2	Yr1: Solve one step problems using multiplication (sharing) Yr2: Recall & use division facts for the 2,3, 5 and 10 multiplication tables. Calculate statements within the multiplication tables and write them using the division and equals signs. [Show division of two numbers <u>cannot</u> be done in any order.]	Use concrete and real objects in real life contexts:	Draw arrays and number lines (first modelled using Numicon and Number lines/ beads/ rekenreks/counters/objects) $15 \div 5 = 3$ <b>COOOD COOOD</b> $15 \div 5 = 3$ <b>COOOD COOOD</b> $15 \div 5 = 3$ <b>COOOD COOOD</b> <b>COOOD COOOD</b> <b>COOOD</b> <b>COOOD COOOD</b> <b>COOOD COOOD</b> <b>COOOD</b> <b>COOOD COOOD</b> <b>COOOD</b> <b>COOOD COOOD</b> <b>COOOD COOOD</b> <b>COOOD</b> <b>COOOD COOOD</b> <b>COOOD</b> <b>COOOD COOOD</b> <b>COOOD</b> <b>COOOD COOOD</b> <b>COOOD COOOD</b> <b>COOOD COOOD</b> <b>COOOD</b> <b>COOOD COOOD</b> <b>COOOD COOOD COOOD</b> <b>COOOD COOOD COOOD</b> <b>COOOD COOOD</b> <b>COOOD COOOD</b> <b>COOOD COOOD COOOD</b> <b>COOOD COOOD COOOD</b> <b>COOOD COOOD COOOD</b> <b>COOOD COOOD COOOD</b> <b>COOOD COOOD COO</b>	In Year 1, children use concrete and pictorial representations to solve problems. They are not expected to record division formally. Children solve problems by grouping and counting the number of groups. Grouping encourages children to count in multiples and links to repeated subtraction on a number line. They can use concrete representations in fixed groups such as number shapes which helps to show the link between multiplication and division. In Year 2, children are introduced to the division symbol: 12 shared between 3 is 4 12 ÷ <b>3</b> = <b>4</b>			

•	<u>Skill:</u>	Concrete:	Pictorial:	Abstract:
	Divide 2 digits by 1 digit (sharing with no exchange)	Use base ten/ place value counters and place value charts to introduce and represent: <b>48÷2=24</b>	Represent base ten or the place value counters pictorially in drawn place value charts; remembering to show what has been exchanged.	Part-whole models can provide children with a clear written method that matches the concrete representation.
Y R 3 / 4	exchange) Divide 2-digits by 1-digit (sharing with exchange) Divide 2-digits by 1-digit (sharing with remainders)	represent: 48+2=24 Tens Ones   Image: 52+4=13   Image: 52+4=13   Image: 52+4=13   Image: 52+4=13   Image: 100   Image:	show what has been exchanged. Draw part-whole/bar models: $48+2=24$ 48 40 40 48 40 48 40 40 48 40 48 40 48 40 48 40 48 49 40 49 49 49 49 49 49 49 49 49 12 52 49 12 52 41 10 + 3 = 13 52 52 52 52 7 7 7 7 7 7 7 7	matches the concrete representation. When dividing numbers with remainders, children can use Base 10 and place value counters to exchange one ten for ten ones. Starting with the equipment outside the place value grid will highlight remainders, as they will be left outside the grid once the equal groups have been made. Formal short division method: $98 \div 7 = 14$ 1  4 7  9  8 $252 \div 7 = 36$ 36 7  252 7  252
		numicon and base ten equally or to use flexible partitioning.	53÷4=13r1 <sup>10</sup> <sup>1+4</sup> <sup>10</sup> <sup>1+4</sup>	

•	Skill:	Concrete:	Pictorial:	Abstract:		
y R 5 / 6	Use the formal written method of short division (interpret remainders appropriately for the context). HTU ÷ O ThHTO ÷ O Divide numbers (up to 4 digits) by TO whole number using the formal method of short /long division (interpret as appropriate for the context). Use written division methods in cases where the answer has up to 2dp.	Place value counters or plain counters can be used on a place value grid to support children to divide 4- digits by 1-digit:	Children can also draw their own counters and group them through a more pictorial method. Draw part-whole/bar models to understand and solve problems:	Short division method: Quotient 72 Divisor $\rightarrow 5$ $361$ $\leftarrow$ Dividend -351 11 -10 $1 \leftarrow$ Remainder 4 2 6 6 2 8 5 13 12 $432 \div 12 = 36$ Long division method: Children can write out multiples to support their calculations with larger remainders. Children solve problems with remainders where the quotient can be rounded as appropriate. $12 \times 1 = 12$ $12 \times 2 = 24$ $12 \times 4 = 48$ $12 \times 5 = 60$ $12 \times 6 = 72$ $12 \times 6 = 72$ $12 \times 8 = 96$ $12 \times 7 = 108$ $12 \times 10 = 120$		
				$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$		

## **Craylands Addition and Subtraction Glossary:**

Addend - A number to be added to another.

**Aggregation -** combining two or more quantities or measures to find a total.

**Augmentation -** increasing a quantity or measure by another quantity.

**Commutative** – numbers can be added in any order.

**Complement** – in addition, a number and its complement make a total e.g. 300 is the complement to 700 to make 1,000

**Difference** – the numerical difference between two numbers is found by comparing the quantity in each group.

**Exchange –** Change a number or expression for another of an equal value.

**Minuend** – A quantity or number from which another is subtracted.

**Partitioning –** Splitting a number into its component parts.

**Reduction –** Subtraction as take away.

**Subitise** – Instantly recognise the number of objects in a small group without needing to count.

**Subtrahend -** A number to be subtracted from another.

Sum - The result of an addition.

**Total** – The aggregate or the sum found by addition.

## **Craylands Multiplication and Division Glossary:**

**Array** – An ordered collection of counters, cubes or other item in rows and columns.

**Commutative –** Numbers can be multiplied in any order.

**Dividend** – In division, the number that is divided.

**Divisor** – In division, the number by which another is divided.

**Exchange** – Change a number or expression for another of an equal value.

**Factor** – A number that multiplies with another to make a product.

**Multiplicand** – In multiplication, a number to be multiplied by another.

**Partitioning –** Splitting a number into its component parts.

**Product –** The result of multiplying one number by another.

Quotient - The result of a division

**Remainder –** The amount left over after a division when the divisor is not a factor of the dividend.

**Scaling –** Enlarging or reducing a number by a given amount, called the scale factor