Chilton Community Primary School

Respect, Believe, Achieve

Power Maths calculation policy, KS1



The following pages show the *Power Maths* progression in calculation (addition, subtraction, multiplication and division) and how this works in line with the National Curriculum. The consistent use of the CPA (concrete, pictorial, abstract) approach across *Power Maths* helps children develop mastery across all the operations in an efficient and reliable way. This policy shows how these methods develop children's confidence in their understanding of both written and mental methods.



KEY STAGE 1

Children develop the core ideas that underpin all calculation. They begin by connecting calculation with counting on and counting back, but they should learn that understanding wholes and parts will enable them to calculate efficiently and accurately, and with greater flexibility. They learn how to use an understanding of 10s and 1s to develop their calculation strategies, especially in addition and subtraction.

Key language: whole, part, ones, ten, tens, number bond, add, addition, plus, total, altogether, subtract, subtraction, find the difference, take away, minus, less, more, group, share, equal, equals, is equal to, groups, equal groups, times, multiply, multiplied by, divide, share, shared equally, times-table

Addition and subtraction: Children first learn to connect addition and subtraction with counting, but they soon develop two very important skills: an understanding of parts and wholes, and an understanding of unitising 10s, to develop efficient and effective calculation strategies based on known number bonds and an increasing awareness of place value. Addition and subtraction are taught in a way that is interlinked to highlight the link between the two operations. A key idea is that children will select methods and approaches based on their number sense. For example, in Year 1, when faced with $15 - 3$ and 15 - 13, they will adapt their ways of approaching the calculation appropriately. The teaching should always emphasise the importance of mathematical thinking to ensure accuracy and flexibility of approach, and the importance of using known number facts to harness their recall of bonds within 20 to support both addition and subtraction methods. In Year 2, they will start to see calculations presented in a column format, although this is not expected to be formalised until KS2. We show the column method in Year 2 as an option; teachers may not wish to include it until Year 3.	Multiplication and division: Children develop an awareness of equal groups and link this with counting in equal steps, starting with 2s, 5s and 10s. In Year 2, they learn to connect the language of equal groups with the mathematical symbols for multiplication and division. They learn how multiplication and division can be related to repeated addition and repeated subtraction to find the answer to the calculation. In this key stage, it is vital that children explore and experience a variety of strong images and manipulative representations of equal groups, including concrete experiences as well as abstract calculations. Children begin to recall some key multiplication facts, including doubles, and an understanding of the 2, 5 and 10 times-tables and how they are related to counting.	Fractions: In Year 1, children encounter halves and quarters, and link this with their understanding of sharing. They experience key spatial representations of these fractions, and learn to recognise examples and non-examples, based on their awareness of equal parts of a whole. In Year 2, they develop an awareness of unit fractions and experience non-unit fractions, and they learn to write them and read them in the common format of numerator and denominator.
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	Year 1			
	Concrete	Pictorial	Abstract	
Year 1 Addition	Counting and adding more Children add one more person or object to a group to find one more.	Counting and adding more Children add one more cube or counter to a group to represent one more.	Counting and adding more Use a number line to understand how to link counting on with finding one more.	
		One more than 4 is 5.	One more than 6 is 7. 7 is one more than 6.	
			Learn to link counting on with adding more than one. 0 + 2 + 3 + 5 + 6 + 7 + 8 + 10 + 10 + 10 + 10 + 10 + 10 + 10	
	Understanding part-part-whole relationship Sort people and objects into parts and understand the relationship with the whole.	Understanding part-part-whole relationship Children draw to represent the parts and understand the relationship with the whole.	Understanding part-part-whole relationship Use a part-whole model to represent the numbers. 10 6 $46 + 4 = 106 + 4 = 10$	
	The parts are 2 and 4. The whole is 6.			







	Adding by counting on Children use knowledge of counting to 20 to	Adding by counting on Children use counters to support and	Adding by counting on Children use number lines or number tracks
	find a total by counting on using people or	represent their counting on strategy.	to support their counting on strategy.
	objects.		
	8 on the bus	7 on the bus	7 7 7 + 5 =
	Adding the 1s	Adding the 1s	Adding the 1s
	Children use bead strings to recognise how	Children represent calculations using ten	Children recognise that a teen is made from
	to add the 1s to find the total efficiently.	frames to add a teen and 1s.	a 10 and some 1s and use their knowledge
			of addition within 10 to work efficiently.
			3 + 5 = 8
	2 + 3 = 5		So, 13 + 5 = 18
	12 + 3 = 15		
		2 + 3 = 5	
		12 + 3 = 15	
-	Bridging the 10 using number bonds	Bridging the 10 using number bonds	Bridging the 10 using number bonds
	Children use a bead string to complete a 10	Children use counters to complete a ten	Use a part-whole model and a number line
	and understand how this relates to the	frame and understand how they can add	to support the calculation.
		using knowledge of number bonds to TO.	(4)
	-00-00-		\bigwedge
	7 add 3 makes 10.		
	SU, 7 AUU S IS TU ANU Z MORE.		(\mathbf{Y})
			4 10 11 12 13 $9 \pm 4 = 13$







Finding the difference Arrange two groups so that the difference between the groups can be worked out.	Finding the difference Represent objects using sketches or counters to support finding the difference.	Finding the difference Children understand 'find the difference' as subtraction.
Image: Second system Image: Second system Image: Second	5 - 4 = 1 The difference between 5 and 4 is 1.	$\begin{array}{c} & & & \\ \hline & & & \\ 0 & 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 \\ 10 - 4 = 6 \\ \hline & \\ The difference between 10 and 6 is 4. \end{array}$
Subtraction within 20 Understand when and how to subtract 1s efficiently.	Subtraction within 20 Understand when and how to subtract 1s efficiently.	Subtraction within 20 Understand how to use knowledge of bonds within 10 to subtract efficiently.
Use a bead string to subtract 1s efficiently.		5 - 3 = 2 15 - 3 = 12
5 - 3 = 2 15 - 3 = 12	5 - 3 = 2 15 - 3 = 12	
Subtracting 10s and 1s For example: 18 – 12	Subtracting 10s and 1s For example: 18 – 12	Subtracting 10s and 1s Use a part-whole model to support the calculation.
Subtract 12 by first subtracting the 10, then the remaining 2.	Use ten frames to represent the efficient method of subtracting 12.	
		$\begin{array}{c} 10 \\ 19 - 14 \\ 19 - 10 = 9 \end{array}$
First subtract the 10, then take away 2.	First subtract the 10, then subtract 2.	9 - 4 = 5 So, 19 - 14 = 5



	Subtraction bridging 10 using number bonds For example: 12 – 7 Arrange objects into a 10 and some 1s, then decide on how to split the 7 into parts. Image: Control of the system	Subtraction bridging 10 using number bonds Represent the use of bonds using ten frames. Image: Imag	Subtraction bridging 10 using number bonds Use a number line and a part-whole model to support the method. 13-5 5 6 7 8 9 10 11 12 13
Year 1 Multiplication	Recognising and making equal groups Children arrange objects in equal and unequal groups and understand how to recognise whether they are equal. A B C Image: Image objects in equal and understand how to Image: Image objects in equal and understand how to Image: Image objects in equal and understand how to Image: Image objects in equal and understand how to Image: Image objects in equal and understand how to Image: Image objects in equal and understand how to Image: Image objects in equal and understand how to Image: Image objects in equal and understand how to Image: Image objects in equal and understand how to Image: Image objects in equal and understand how to Image: Image objects in equal and understand how to Image o	Recognising and making equal groups Children draw and represent equal and unequal groups.	Describe equal groups using words <i>Three equal groups of 4.</i> <i>Four equal groups of 3.</i>
	Finding the total of equal groups by counting in 2s, 5s and 10s There are 5 pens in each pack 510152025303540	Finding the total of equal groups by counting in 2s, 5s and 10s 100 squares and ten frames support counting in 2s, 5s and 10s. 1 2 3 4 5 6 7 8 9 10 1 2 2 2 2 2 2 2 4 2 5 2 6 2 7 2 8 2 4 30 3 3 2 2 3 3 4 5 5 6 7 8 9 40 4 4 2 4 3 4 4 5 4 6 4 7 4 8 4 9 50	Finding the total of equal groups by counting in 2s, 5s and 10s Use a number line to support repeated addition through counting in 2s, 5s and 10s. 10 10 10 10 10 0 10 20 30 40 50



Year 1 Division	Grouping Learn to make equal groups from a whole and find how many equal groups of a certain size can be made.Sort a whole set people and objects into 	Grouping Represent a whole and work out how many equal groups.	Grouping Children may relate this to counting back in steps of 2, 5 or 10.
	Sharing Share a set of objects into equal parts and work out how many are in each part.	Sharing Sketch or draw to represent sharing into equal parts. This may be related to fractions. Image: Construction of the second state of the seco	Sharing 10 shared into 2 equal groups gives 5 in each group.



Year 2			
	Concrete	Pictorial	Abstract
Year 2 Addition			
Understanding 10s and 1s	Group objects into 10s and 1s.	Understand 10s and 1s equipment, and link with visual representations on ten frames.	Represent numbers on a place value grid, using equipment or numerals. Tens Ones 3 2 Tens Ones 4 3
Adding 10s	Use known bonds and unitising to add 10s. ()) ()) ()) ()) ()) ()) ()) ()	Use known bonds and unitising to add 10s. $ \begin{array}{c} \bullet & \bullet \\ \bullet &$	Use known bonds and unitising to add 10s. 7 4 3 4 + 3 = 1 4 + 3 = 7 $4 \tan 3 = 7 \tan 3$ 40 + 30 = 70





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Adding a	Exchange 10 ones for 1 ten.	Exchange 10 ones for 1 ten.	Exchange 10 ones for 1 ten.
to a 2-digit number using exchange			$\begin{array}{c} T \\ \hline 2 \\ + \\ \hline 2 \\ \hline 1 \\ \hline \end{array}$
			$ \begin{array}{c} 1 & 0 \\ 2 & 4 \\ 8 \\ 3 & 2 \\ 1 \end{array} $
Adding a	Add the 10s and then recombine.	Add the 10s and then recombine.	Add the 10s and then recombine.
multiple of 10 to a 2-digit number	27 is 2 tens and 7 ones. 50 is 5 tens. There are 7 tens in total and 7 ones. So, 27 + 50 is 7 tens and 7 ones.	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	37 + 20 = ? 30 + 20 = 50 50 + 7 = 57 37 + 20 = 57

Adding a multiple of 10 to a 2-digit number using columns	Add the 10s using a place value grid to support. TOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO	Add the 10s using a place value grid to support. TO O O O O O O O O O O O O O O O O O O	Add the 10s represented vertically. Children must understand how the method relates to unitising of 10s and place value. $\begin{array}{r} \hline T & O \\ \hline I & 6 \\ + & 3 \\ \hline 0 \\ \hline 4 & 6 \end{array}$ $1 + 3 = 4$ $1 \ ten + 3 \ tens = 4 \ tens$ $16 + 30 = 46$
Adding two 2-digit numbers	Add the 10s and 1s separately. Add the 10s and 1s separately. 5+3=8 There are 8 ones in total. 3+2=5 There are 5 tens in total. 35+23=58	Add the 10s and 1s separately. Use a part-whole model to support. 32 + 11 $11 = 10 + 1$ $32 + 10 = 42$ $42 + 1 = 43$ $32 + 11 = 43$	Add the 10s and the 1s separately, bridging 10s where required. A number line can support the calculations. $\frac{17}{17} + 10 + 10 + 3 + 2 + \frac{T}{17} + \frac{2}{2} = \frac{1}{17}$ 17 + 25



Adding two 2-digit	Add the 1s. Then add the 10s.	Add the 1s. Then add the 10s.
numbers using a place value grid	Tens Ones	$\begin{array}{c} T \\ \hline 0 \\ 3 \\ 2 \\ + 1 \\ \hline 6 \\ \hline \end{array}$
	Tens Ones	T O 3 2 + 1 4 4 6
Adding two	Add the 1s. Exchange 10 ones for a ten.	Add the 1s. Exchange 10 ones for a ten.
2-digit numbers with	Then add the 10s.	Then add the 10s.
exchange	+ 2 q Tens Ones	$ \begin{array}{c} T \\ T \\ $
	Tens Ones (1) (2) (2) (65



Year 2 Subtraction			
Subtracting multiples of 10	Use known number bonds and unitising to subtract multiples of 10.	Use known number bonds and unitising to subtract multiples of 10.	Use known number bonds and unitising to subtract multiples of 10.
	· · · · · · · · · · · · · · · · · · ·	IOO 30	2 5 20 50
	8 subtract 6 is 2. So, 8 tens subtract 6 tens is 2 tens.	10 - 3 = 7 So, 10 tens subtract 3 tens is 7 tens.	7 tens subtract 5 tens is 2 tens. 70 − 50 = 20
Subtracting a single-digit number	Subtract the 1s. This may be done in or out of a place value grid.	Subtract the 1s. This may be done in or out of a place value grid.	Subtract the 1s. Understand the link between counting back and subtracting the 1s using known bonds.
			Image: 1 Image
			$ \begin{array}{cccc} T & O \\ 3 & q \\ - & 3 \\ \hline 3 & 6 \\ \hline 3 & 6 \\ 39 - 3 = 36 \end{array} $
Subtracting a	Bridge 10 by using known bonds.	Bridge 10 by using known bonds.	Bridge 10 by using known bonds.
number bridging 10			-4 -4 16 17 18 19 20 21 22 23 24 25 26
	35 − 6 I took away 5 counters, then 1 more.	35 − 6 First, I will subtract 5, then 1.	24 - 6 = ? 24 - 4 - 2 = ?





Subtracting a 2-digit number using place value and columns	Subtract the 1s. Then subtract the 10s. This may be done in or out of a place value grid. $\begin{array}{c c} T & O \\ \hline & & & \\ $	Subtract the 1s. Then subtract the 10s.	Using column subtraction, subtract the 1s. Then subtract the 10s. $T \bigcirc 45$ -12 3 $T \bigcirc 45$ -12 3 3 3 3 3 3 3 3
Subtracting a 2-digit number with exchange		Exchange 1 ten for 10 ones. Then subtract the 1s. Then subtract the 10s.	Using column subtraction, exchange 1 ten for 10 ones. Then subtract the 1s. Then subtract the 10s. $\frac{T}{4} \frac{O}{5}$ $-2 \frac{7}{2}$ $\frac{T}{2} \frac{O}{3\# 5}$ $-2 \frac{7}{2}$ $\frac{T}{3\# 5}$ $-2 \frac{7}{8}$ $\frac{T}{8}$ $\frac{T}{3\# 5}$ $-2 \frac{7}{8}$

Year 2 Multiplication			
Equal groups and repeated addition	Recognise equal groups and write as repeated addition and as multiplication.	Recognise equal groups using standard objects such as counters and write as repeated addition and multiplication.	Use a number line and write as repeated addition and as multiplication. $\begin{array}{c} & & \\$
Using arrays to represent multiplication and support understanding	Understand the relationship between arrays, multiplication and repeated addition.	Understand the relationship between arrays, multiplication and repeated addition.	Understand the relationship between arrays, multiplication and repeated addition. 0 5 10 15 20 25 $5 \times 5 = 25$
Understanding commutativity	Use arrays to visualise commutativity.	Form arrays using counters to visualise commutativity. Rotate the array to show that orientation does not change the multiplication. This is 2 groups of 6 and also 6 groups of 2.	Use arrays to visualise commutativity. 4+4+4+4+4=20 5+5+5+5=20 $4 \times 5=20$ and $5 \times 4=20$











Grouping equally	Understand how to make equal groups from a whole.	Understand the relationship between grouping and the division statements.	Understand how to relate division by grouping to repeated subtraction.
	<u></u>	$12 \div 3 = 4$	
	8 divided into 4 equal groups. There are 2 in each group.	$12 \div 4 = 3$	0 1 2 3 4 5 6 7 8 9 10 11 12
		12 ÷ 6 = 2	There are 4 groups now.
			12 divided into groups of 3. 12 \div 3 – 4
		$12 \div 2 = 6$	There are 4 groups
Using known	Understand the relationship between	Link equal grouping with repeated	Relate times-table knowledge directly to
times-tables to solve divisions	multiplication facts and division.	subtraction and known times-table facts to support division.	division.
			$ \begin{array}{l} 1 \times 10 = 10 \\ 2 \times 10 = 20 \\ 3 \times 10 = 30 \\ 4 \times 10 = 40 \\ 5 \times 10 = 50 \end{array} $ I used the 10 times-table to help me.
		40 divided by 4 is 10.	6 × 10 = 60 7 × 10 = 70 3 × 10 = 30.
	4 groups of 5 cars is 20 cars in total. 20 divided by 4 is 5.	Use a bar model to support understanding of the link between times-table knowledge and division.	8 × 10 = 80 I know that 3 groups of 10 makes 30, so I know that 30 divided by 10 is 3.
			$3 \times 10 = 30$ so $30 \div 10 = 3$



Vocabulary to be on display when covering a unit

Reception and Year One

Number and	Addition and	Multiplication	Measure	Geometry	Geometry	Fractions	General/ Problem
Place Value	Subtraction	and Division		(position	(properties of		solving
				and	shape)		
				direction)			
Number	Number	Odd, even	Full, half full, empty	Position	Group, sort	Whole	Listen, join in
	bonds, number						
Zero, one,	line	Count in twos,	Holds	Over,	Cube, cuboid,	Equal	Say, think, imagine,
two, three to		threes, fives		under,	pyramid,	parts,	remember
twenty, and	Add, more,		Container	underneat	sphere, cone,	four	
beyond	plus, make,	Count in tens		h, above,	cylinder,	equal	Start from, start
	sum, total,	(forwards	Weigh, weighs, balances	below,		parts	with, start at
None	altogether	from/backwards		top,	Circle,		
		from)	Heavy, heavier, heaviest,	bottom,	triangle,	One half,	Look at, point to
Count	Inverse		light, lighter, lightest	side	square,	two	
(on/up/to/fro		How many			rectangle, star	halves	Put, place, fit
m/down)	Double, near	times?	Scales	on, in,			
	double			outside,	Shape	А	Arrange, rearrange
Before, after		Lots of, groups	Time	inside		quarter,	
	Half, halve	of			Flat, curved,	two	Change, change over
More, less,			Days of the week:	around,	straight, round	quarters	
many, few,	Equals, is the	Once, twice,	Monday, Tuesday, etc.	in front,			Split, separate
fewer, least,	same as	three times, five		behind	Hollow, solid		
fewest,	(including	times	Seasons: spring, summer,				Carry on, continue,
smallest,	equals sign)		autumn, winter	Front,	Corner (point,		repeat, what comes
greater,		Multiple of,		back	pointed)		next?
lesser	Difference	times, multiply,	Day, week, month, year,				
	between	multiply by	weekend	Before,	Face, side,		Find, choose,
Equal to, the				after	edge		collect, use, make,
same as	How many	Repeated	Birthday, holiday				build
	more to				Make, build,		

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Odd gran	maka 2 hay	addition	Maming afternam	Pacida	draw	Tall ma dasariba
Ouu, even	nuike, now	addition	Morturg, allertoort,	Deside,		Teu me, descrube,
	many more		evening, night, midnight	next to,		pick out, talk about,
	isthan?,	Array, row,		Opposite		explain, show me
	how much	column	Bedtime, dinnertime,			
	more is?		playtime	Apart		Read, write, record,
		Double, halve				trace, copy, complete,
	Subtract, take		Today, yesterday,	Between,		finish, end
	away, minus	Share, share	tomorrow	middle,		
	5	equally		edge,		Fill in, shade,
	How many	V	Before, after	centre		colour. tick. cross.
	fewer is	Group in pairs.	,			draw. draw a line
	than?.	threes. etc.	Next. last	Corner		between, join (up).
	how much less	,				ring arrow
	is ?	Faual armins of	Now soon early late	Direction		
	05	Equal groups of				Cart
			Quick quicker quickert	Territoria		COSC
		Divide, divided	Quick, quicker, quickest,	Journey		
		by, left, left	quickly, fast, faster,			Count, work out,
		over	tastest,	Left,		answer, check
				right, up,		same
			slow, slower, slowest,	down,		number(s)/different
			slowly	forwards,		number(s)/missing
				backward		number(s)
			Old, older, oldest, new,	л,		
			newer, newest	sideways		Number facts,
						number line.
			Takes longer takes less	Across		number track
			time			number square
				Close		number cards
			Hour o'olook half nach	Guse,		
			Clark worken hand			Abaaya aayahar
			Ciock, watch, rahas	A 1		Abacus, counters,
				Along,		cubes, blocks, rods,
			How long ago?, how	through		
			long will it be to?, how			die, dice,
						dominoes, pegs,



	long will it take to?,	To, f ro m,		peg board
	how often?	towards,		
		away		Same way, different
	Always, never, often,	from		way, best way,
	sometimes, usually			another way
		Movement		In order, in a
	Once, twice			different order
	First, second, third, etc.	Slide,		
		roll,		Not all, every, each
	Estimate, close to, about	Turn,		
	the same as, just over,	whole		
	just under	Turn,		
		half Turn		
	Too many, too few, not			
	enough, enough	Stretch,		
		bend		
	Length, width, height,			
	depth			
	Long, longer, longest,			
	short, shorter shortest,			
	tall, taller, tallest, high,			
	higher, highest			
	Low, wide, narrow, deep,			
	shallow, thick, thin			
	Far, near, close			
	Metre, ruler, metre stick			
	Money, coin, penny,			
	pence, pound, price, cost,			
	buy, sell, spend, spent,			



	pay, change, dear(er), costs more, costs less cheaper costs the		
	same as		
	How much? How many? Total		

Year Two

Number and	Measure	Geometry	Geometry (properties of	Fractions	Data/ Statistics	General/ Problem
Place Value		(position and	shape)			solving
		direction)				
Numbers to one	Quarter past/to	Rotation	Size	Three	Count, tally, sort	Predict
hundred				quarters, one		
	m/km, g/kg,	Clockwise,	Bigger, larger, smaller	third, two	Vote	Describe the
Hundreds	ml/l	anticlockwise		thirds, three		pattern, describe
			Symmetrical, line of	thirds etc.	Graph, block graph,	the rule
Partition,	Temperature	Straight line	symmetry	Equivalence,	pictogram,	
recombine	(degrees)			equivalent		Find, find all, find
		Ninety degree	Fold		Represent	different
Hundred		turn, right				
more/less		angle	Match		Group, set, list, table	Investigate
			Mirror line, reflection		Label, title	
			Pattern, repeating pattern		Most popular, most	
					common, least	
			Pentagon, hexagon, octagon		popular, least common	