

# **Billingshurst Primary School**

Long Term Maths Plan

		M			14/ L E			144.1.7
YEAR 6	Week 1	Week 2	Week 3	Week 4	Week 5		Week 6	Week 7
AUTUMN 1	Week L         Calculating using knowledge of strug         RtP:         • 6AS/MD-1 Page 298         • 6AS/MD-2 Page 302         SPINE:         1.28 Common structures and the part         1.29 Using equivalence and the comp         The Big Ideas Deciding which calcular         calculating 8·78 + 5·26 might involve         numbers: 367 + 275 + 525 is probable         Small Steps:         1       Pupils explain how a combination         2       Pupils identify structures within s         3       Pupils interpret and represent ap         5       Pupils create stories to correctly of         6       Pupils calculate the value of a mis         8       Pupils calculate the value of a mis         9       Pupils correctly represent an equ         10       Pupils explain how adjusting both         11       Pupils explain how adjusting both         12       Pupils use the 'same sum' rule to         13       Pupils explain how adjusting both         14       Pupils explain how adjusting both         15       Pupils explain how adjusting both         16       Pupils explain how adjusting both         17       Pupils explain how using the 'samt         10       Pu	rt-part-whole relationship pensation category to calculate (1 tion method to use is supported by calculating 8·75 + 5·25 and then a y best thought of as 367 + (275 + 5 n of different parts can be equivale stories and use their knowledge of sing their knowledge of part whole boart-whole problem with 3 addend match a structure presented in a n ditive structures to solve problems ssing part (1) ssing part (2) ation in a part-whole model n addends affects the sum (2 digit n n addend affects the sum (2 digit n n addend affects the sum (2 digit n n addend affects the sum mentally by using known facts sing addends n the minuend and subtrahend by the difference' rule can make mental use difference' rule can make mental decreasing the minuend affects the decreasing the subtrahend affects the decreasing the subtrahend affects ing their knowledge of an adjusted ing th	Teaching Point 1 – 5 ONLY) y being able to take apart and com djusting the answer. The associative 525) rather than (367 + 275) + 525. ent to the same whole and can represent structures to create stories e relationships and structures as using a model nodel numbers) I fractions) wn the same amount affects the difference al calculation easier (1) en calculation easier (2) e difference (1) e difference (2) tion easier the difference d subtrahend (1) d subtrahend (2 e numbers.	bine numbers in many ways. For ex re rule helps when adding three or resent this in an expression	cample, more	Multiples of 1000 <u>SPINE:</u> 1.26 Multiples of 1,00 <u>Small Steps:</u> 1 Pupils explain how 2 Pupils explain how 3 Pupils read and wri 4 Pupils read and wri 5 Pupils identify and unlabelled number 6 Pupils identify and unlabelled number 7 Pupils count forwa 8 Pupils explain that 9 Pupils read scales i 10,000 and 100,000 <u>NC:</u> Read, write, order and	A compare numbers up to 10,000,000.	sand numbers, on a marked, but and numbers, on a marked, but ny multiple of 1,000 Os nowledge of the composition of

## Year: 6

AUTUMN 2	Numbers up to 10,000,000 RtP:	dentify and explain pattern digit numbers using comm he composition of up to eign bers with up to seven digit mbers that contain place-h ligits in numbers up to tens up to eight-digit numbers he composition of seven-d ly without bridging a boun sing the millions boundary crossing the millions boundary to seven digits on marked bound to round seven-digits use action problems and explain to calculations to solve num rs, reading, writing, ordering ands inn steps of 1,000,100, unders up to 10,000,000 D,000 to the nearest 10,000,000 D,000	s in powers of 10 on intervals ght-digit numbers to solve problems is efficiently olding zeroes ; of millions igit numbers to solve problems dary (only one and more than one digit dary (multiples of 100,000 and different d and decomposed into parts ce i number lines narked or partially marked number lines t number to the nearest million earest hundred thousand any power of 10 in context a calculation sing column addition and subtraction rategies to solving addition and subtraction rategies to solving addition and subtraction rategies to solving addition and subtraction n whether a mental or written strategy ber problems and practical problems that ng and comparing numbers to 1,000,000 000 and 100,000 from any number up to 10 10,000, 1000, 100 and 10, 000 from any number up to 1,000,000. nd solve problems that involve rounding which operations and methods to use .	Draw, compose and decompose shapes         RtP:         • 6G-1 Page 322         Prior Learning RtP:         • 4G-2 Page 197         • 5G-1 Page 265         • 5G-2 Page 269         Small Steps:         1 Use knowledge of shape properties to dr         2 The same 3D shape can be composed for         3 When a 2D shape is decomposed and th         shape is therefore equal to the total of t         4 Any parallelogram can be decomposed as         5 Two congruent triangles can be composed         6 Shapes with the same area can have diff         areas         7 We can use the relationship between arr         measurements of shapes, including com         NC:         Draw 2D shapes using given dimensions ar         Y5: Identify 3-D shapes, including cubes ar         Recognise, describe and build simple 3-D s         Classify geometric shapes based on their p         and regular polygons -         Recognise that shapes with the same area	raw, sketch and identify shapes om different 2D nets e parts rearranged, the area remains the same. The he areas of the constituent parts and the parts rearranged to form a rectangular para ed to form a parallelogram erent perimeters. Shapes with the same perimeter ea and side length, and perimeter and side length, pound shapes and angles. Ad cuboids, from 2-D representations. Appendix and sizes and find unknown angles in an s can have different perimeters and vice versa.
	Lice estimations to shack any	Solve addition and subtraction multi-step problems, deciding which operations and methods to use .			
	Use estimations to check answers	to calculations .			
	Generate and describe linear num	ber sequences.			
	Y5:Solve number problems and pr	actical problems that invol	ve all of the above.		
YEAR 6	Week 1	Week 2	Week 3	Week 4	Week 5

ie area of a compoun
----------------------

- allelogram
- ers can have different
- , to reason about

ny triangles, quadrilaterals

### Multiplication

#### SPINE: 2.18 Using equivalence to

## <u>calculate</u>

Small Steps:

Important prior learning: Making a given number (up to 9,999) 10,100, 1 tenth or 1 hundredth times the size (multiply and divide by 10 and 100)

#### Recap factors, multiples, primes

- 1 Pupils explain why the product stays the same when one factor is doubled and the other is halved
- 2 Pupils explain the effect on the product when scaling the factors by the same amount
- 3 Pupils use their knowledge of equivalence when scaling factors to solve problems
- 4 Pupils explain the effect on the quotient when scaling the dividend and divisor by 10
- 5 Pupils explain the effect on the quotient when scaling the dividend and divisor by the same amount

### NC:

Identify the value of each digit to three decimal places and X and / numbers by 10, 100 <del>and 1000 to</del> give answers up to 3 decimal places.

Perform mental calculations, including with mixed operations and large numbers. Identify common factors, <del>multiples and prime numbers.</del>

Week 6

Week 7

Mu	Itiplication (continued) and Division				Area, perimeter, position and dire	ection
<u>KIP</u>	• 645/MD-2 Page 302				2 30 Multiplicative contexts: area	and perimeter 2
SPI	NF.				Small Steps:	and permeter 2
2.1	B Using equivalence to calculate				1 Pupils explain how to calculate t	the area of a paral
2.2	3 Multiplication strategies for larger numb	ers and long multiplication			2 Pupils explain how to calculate t	the area of a trian
2.2	1 Division: dividing by two-digit numbers				3 Pupils explain why shapes can h	ave the same peri
2.2	5 Using compensation to calculate				areas	
Sma	all Steps:				4 Pupils explain why shapes can h	ave the same area
6	Pupils explain how to multiply a three-dig	git by a two-digit number			perimeters	
7	Pupils explain how to accurately use the	method of long multiplication	n to multiply two, two-digit	numbers (no regrouping of ones to tens)	5 Pupils describe the relationship	between scale fac
8	Pupils explain how to accurately use the	method of long multiplication	n (with regrouping of ones t	o tens)	of two shapes	
9	Pupils explain how to accurately use the	method of long multiplication	n (with regrouping of ones t	o tens & tens to hundreds)	6 Pupils describe the relationship	between scale fac
10	Pupils explain how to accurately use the	method of long multiplication	n to multiply a three-digit by	y a two-digit number	of two shapes	
11	Pupils explain how to accurately use the	method of long multiplication	n to multiply a four-digit by	a two-digit number	7 Pupils describe positions on the	full coordinate gr
12	Pupils explain how to use the associative	law to multiply efficiently			8 Pupils draw and translate simple	shapes on the co
13	Pupils explain when it is more efficient to	o use long multiplication or fa	ctorising to multiply by two	-digit numbers	reflect them in the axes	
14	Pupils explain how to use accurately the	methods of short and long div	vision (two and three-digit r	number by multiples of 10)		
15	Pupils explain how to use accurately the	method of long division with	and without remainders (tw	vo-digit by two-digit numbers)	<u>NC:</u>	
16	Pupils use knowledge of long division to a	solve problems in a range of o	contexts (with and without r	remainders)	Calculate the area of parallelogram	ns and triangles a
17	Pupils explain how to use a ratio chart to	solve efficiently: short division	on		Recognise that shapes with the sa	me areas can hav
18	Pupils explain how to use a ratio chart to	solve efficiently: long division	n		and vice versa.	
19	Pupils explain how to use a ratio chart to	solve efficiently: long division	n (II)		Solve problems involving similar s	hapes where the
20	Pupils explain how to use accurately the numbers)	method of long division with	and without remainders (th	ree-digit by two-digit, four-digit by two-digit	or can be found. Describe positions on the full co-o	ordinates grid (all f
21	Pupils use long division with decimal rem	nainders (1 decimal place)			Draw and translate simple shapes	on the co-ordinat
22	Pupils use long division with fraction rem	nainders			in the axes .	
23	Pupils use long division with decimal rem	nainders (2 decimal places)				
24	Pupils use knowledge of the best way to	interpret and represent rema	inders from a range of divis	sion contexts		
25	Pupils explain how and why a product ch	anges when a factor changes	multiplicatively			
26	Pupils use their knowledge of multiplicat	ive change to solve problems	efficiently (multiplication)			
27	Pupils explain how and why a quotient cl	hanges when a dividend chan	ges multiplicatively (increas	se or decrease)		
28	Pupils explain how and why a quotient cl	hanges when a divisor change	s multiplicatively			
29	Pupils identify and explain the relationsh	ip between divisors and quot	ients			
	· · ·					
Mu Div frac Use	tiply numbers up to 4 digits by a 2-digit wh de numbers up to 4-digits by a 2-digit whol tions or by rounding where needed . written division methods in cases where the re multi stan problems involving the 4 rule	ole number using an efficient le numbers using short or long he answer has up to 2 decima	written method . g division and interpret rem I places .	nainders as whole number remainders,		
501	e muiti-step problems involving the 4 rules	<b>5.</b>				
We	ek 1 Week 2		Week 3	Week 4	Week 5	Week 6

Τ

SPRING

- llelogram
- gle
- imeters but different
- as but different
- ctors and side lengths
- ctors and perimeters
- rid (all four quadrants) pordinate plane and
- ind be able to use the
- e different perimeters
- scale factor is known
- four quadrants). te plane, reflect them

	-							
	Frac	ctions and Percentages						
	RtP:	<u>.</u>			SPINE:			
		• <u>6F-1 Page 312</u>			3.7 Finding equivalent fr	ractions and simplifying fractions		
		• <u>6F-2 Page 316</u>			3.8 Common denominat	tion: more adding and subtracting		
		• <u>6F-3 Page 319</u>			3.9 Multiplying fractions	s and dividing fractions by a whole number		
	Prio	or Learning RtP:			3.10 Linking fractions, d	ecimals and percentages		
		• <u>5F-2 Page 258</u>						
	Sma	III Steps:	to the strend set former					
	1	Pupils explain now to write a fraction	n in its simplest form					
	2	Pupils reason and apply their knowle	edge of how to write a fractic	on in its simplest form				
	3	Pupils use their knowledge of how to	write a fraction in its simple	est form when solving addition and subtraction pro	blems (1)			
	4	Pupils use their knowledge of how to	write a fraction in its simple	est form when solving addition and subtraction pro	blems (2)			
	5	Pupils use their knowledge of how to	write a fraction in its simple	est form when solving multiplication problems				
	<ul> <li>rupis explain, using all inlage, now to add related fractions (drift fractions)</li> <li>Public explain what is meant by 'related fractions'</li> </ul>							
	7 Pupils explain what is meant by 'related fractions'							
	8	Pupils explain, without using an imag	ge, how to add related fraction	ons				
	9	Pupils use their knowledge of adding	related fractions to solve pr	oblems in a range of contexts				
	10	Pupils explain, with and without usin	ig an image, how to subtract	related fractions (unit fractions)				
	11	Pupils use their knowledge of adding	and subtracting related frac	tions to solve problems in a range of contexts				
	12	Pupils explain, with and without usin	g an image, how to add and	subtract related fractions (non-unit fractions)				
	13	Pupils explain, with and without usin	g an image, how to add and	subtract related fractions (non-unit fractions that I	oridge the whole)			
	14	Pupils use their fraction sense to frac	ction addition, subtraction ar	nd comparison				
	15	Pupils explain how to add or subtract	t non-related fractions with o	different denominators				
	16	Pupils use their knowledge of adding	or subtracting non-related f	ractions with different denominators to solve prob	lems in a range of contexts (nor	n-related fractions)		
	17	Pupils explain how to compare pairs	of non-related fractions (cor	overting to common denominators)				
	18	Pupils explain how to compare pairs	of non-related fractions (using	ng fraction sense)				
2	19 Pupils explain how to compare pairs of non-related fractions (using common numerators)							
	20 Pupils explain which method for comparing non-related fractions is most efficient							
	21 Pupils explain how to multiply two unit fractions							
	22 Pupils explain how to multiply two non-unit fractions							
	23 Pupils explain how to divide a unit fraction by a whole number							
<b>D</b>	24 Pupils explain how to divide a non-unit fraction by a whole number							
S	25 Pupils explain when and how to divide efficiently a fraction by a whole number							
	26 Pupils explain what percent means							
	27 Pupils explain how to represent a percentage in different ways							
	28	28 Pupils explain how to convert percentages to decimals and fractions (with a denominator of 100)						
	29	29 Pupils explain how to convert a percentage to a fraction (without denominator of 100)						
	30	30 Pupils use their knowledge of fraction-decimal-percentage conversions to solve conversion problems in a range of contexts						
	31	31 Pupils use their knowledge of calculating 50%, 10% and 1% of a number to solve problems in a range of contexts						
	32	32 Pupils use their knowledge of calculating common percentages of a number to solve problems in a range of contexts						
	33	Pupils use their knowledge of calcula	ating any percentage of a nur	nber to solve problems in a range of contexts				
	34	Pupils explain how to solve problems	s where the percentage part	and the size of the part is known and the whole is	unknown			
	35	Pupils explain how to solve problems	s where the known percenta	ge part and the size of the part changes the whole				
		36 Interpret and construct pie charts	and use these to solve prob	lems using my knowledge of angles, fractions and	percentages.			
		37 illustrate and name parts of circle	s, including radius, diameter	and circumference.				
		Suggestions: Link to fractions, ang	gles, percentages and unders	tanding proportional relationships				
		Consider the use of II as an accur	ate and efficient way to crea	te a graph in which a circle is divided into sectors t	hat represent proportions of the	e whole		
		When constructing his charts rel	ate the central angle of each	slice back to 360°. For example, an angle of 90° is	1/1 of the circle because 90/360	)=1//		
		Also draw attention to the fact the	at the size of the circle can b	e different but still represent the same data.	p + of the chele because 50/500	,- <u>u</u>		
	NC:							
	Use	common factors to simplify fractions ar	nd common multiples to exp	ress fractions in the same denomination.				
	Add	and subtract fractions with different de	enominators and mixed num	bers using the idea of equivalent fractions.				
	Reca	all and use equivalences between simple	e fractions, decimals and per	centages in different contexts .				
	Com	pare and order fractions including fract	tions >1. itiaa tha annuar in ita aireala	et form (o o 1/4 · 1/2). Divide over en frontione hu	whale average (2, 2, 1/2, 1, 2, 1			
		uply simple pairs of proper fractions wr	symbol (%) and write person	istronm (e.g. $1/4 \times 1/2$ ); Divide proper fractions by	whole numbers (e.g. $1/3 \div 2 = 1$	L/ OJ.		
	15.1 Y5+4	Know percentage and decimal equivaler	$\frac{1}{2}$ nts of $\frac{1}{2}$ , $\frac{1}{2}$ , $\frac{1}{5}$ , $\frac{2}{5}$ and $\frac{4}{5}$	and fractions with a denominator of a multiple of	10 or 25 .			
	Find	a percentage of any given number. e.g.	. 15% of 360 .					
	Inter	rpret and construct pie charts and use t	hese to solve problems using	g my knowledge of angles, fractions and percentag	es.			
	Illust	trate and name parts of circles, includin	ng radius, diameter and circu	mference.				
	Find	decimal fractions by using division, e.g.	. 3/8 as 0.375.		1			
YEAR 6	We	ek 1	Week 2	Week 3	Week 4	Week 5	Week 6	

### Ratio and proportion

- <u>RtP:</u> • <u>6AS/MD-3 Page 305</u>
- SPINE:

2.27 Scale factors, ratio and proportional reasoning

#### Small Steps:

1 Pupils describe the relationship between two factors (in a ratio context)

- 2 Pupils explain how to use multiplication and division to calculate unknown values (two variables)
- 3 Pupils explain how to use multiplication and division to calculate unknown values (three variables)
- 4 Pupils explain how to use a ratio grid to calculate unknown values
- 5 Pupils explain how to use multiplication to solve correspondence problems
- 6 Pupils explain how and why scaling is used to make and interpret maps
- 7 Pupils will use their knowledge of multiplication and division to solve scaling problems in a range of contexts
- 8 Pupils identify and describe the relationship between two shapes using scale factors (squares)
- 9 Pupils identify and describe the relationship between two shapes using scale factors and ratios (regular polygons)
- 10 Pupils identify and describe the relationship between two shapes using scale factors and ratios (irregular polygons)

#### NC:

#### Solve problems involving the relative sizes of 2 quantities.

Solve problems involving unequal sharing and grouping e.g. 'for every egg you need three spoonfuls of flour' Work out all possibilities of combinations of two variables.

Τ

Week 1	Week 2	Week 3	Week 4	Week 5	Week 6

	Calculating using knowledge of structures (2)	Solving problems with two unknowns	Order of operations	
	<u>RtP:</u>	<u>RtP:</u>	SPINE:	
	• <u>6AS/MD-2 Page 302</u>	• <u>6AS/MD-4 Page 308</u>	2.22 Combining multiplication with addition and	
	<u>SPINE:</u>	SPINE:	subtraction	
	1.29 Using equivalence and the compensation property to calculate	1.31 Problems with two unknowns	Also explore Maths No Problem style questions	
	(Teaching Point 6)	Small Steps:	for this unit	
	Small Steps:	1 Pupils compare the structure of problems with one or two unknowns	Small Steps:	
	1 Pupils explain how to balance equations with addition expressions	2 Pupils compare the structure of problems with two unknowns	1 Pupils explain how addition and subtraction	
	2 Pupils explain how to balance equations with subtraction expressions	3 Pupils represent the structure of contextual problems with two	can help to solve multiplication problems	
	3 Pupils explain how to balance equations with addition or subtraction	unknowns	efficiently (I)	
	expressions	4 Pupils represent a problem with two unknowns using a bar model	2 Pupils explain how addition and subtraction	
	4 Pupils explain how to balance equations with addition and subtraction	5 Pupils explain why sometimes there is only one solution to a sum and	can help to solve multiplication problems	
	expressions	difference problem	efficiently (II)	
	5 Pupils use their knowledge of balancing equations to solve problems	6 Pupils explain why sometimes there is only one solution to a sum and	3 Pupils explain how the distributive law applies	
$\sim$		multiple problem	to multiplication expressions with a common	
	NC:	7 Pupils explain the values a part-whole model could represent	factor (addition)	
	Solve addition and subtraction multi-step problems, deciding which	8 Pupils use a bar model to visualise how to solve a problem with two	4 Pupils use their knowledge of the distributive	
H	operations and methods to use .	unknowns	law to solve equations including multiplicati	
2		9 Pupils use diagrams to explain how to solve a spatial problem	addition and subtraction	
Σ		10 Pupils explain how to represent an equation with a bar model	5 Pupils explain how addition and subtraction	
		11 Pupils solve problems with two unknowns in a range of contexts	can help to solve division problems efficiently	
5		12 Pupils solve problems with two unknowns in a range of contexts	6 Pupils explain how the distributive law applies	
• /		and improvement' (one and several solutions)	to division expressions with a common divisor	
		12 Dupils available how I know I have found all passible solutions to	(addition)	
		13 Pupils explain now I know I have found all possible solutions to	7 Pupils explain how the distributive law applies	
		problems with two unknowns	to division expressions with a common divisor	
		14 Pupils explain now to balance an equation with two unknowns	(subtraction)	
		15 Pupils systematically solve problems with two unknowns using 'trial	8 Pupils use their knowledge of the distributive	
		and improvement (one, several and infinite solutions)	law to solve equations including division,	
		NC:	addition and subtraction	
		Use simple formulae.	NC:	
		Express missing number problems algebraically.	Use my knowledge of the order of operations to	
		unknowns or a what is 22+2b if 2-2 and b-2	carry out calculations involving the 4 operations.	
		Work out all possibilities of combinations of two variables	Solve multi-step problems involving the 4 rules.	
		Solve multi-step problems involving the 4 rules		

#### Cross Curricular opportunities: Statistics:

The interpretation of data can be threaded into other units where pupils apply their understanding of number.

Cross-curricular opportunities to address this topic

- Science and history can present opportunities to display and interpret data in response to a hypothesis such as 'The heavier the object, the faster it falls'; 'Most pupils at Healthy Primary School walk to school'; 'The most common job in Sheffield in the 1930s was a steelworker'
- Use the data presented in a line graph to answer questions such as: 'How many more ...' 'How many fewer...'

#### Proportion and Ratio:

- Solve problems involving the relative sizes of 2 quantities: cooking contexts linked with DT •
- Solve problems involving unequal sharing and grouping e.g. 'for every egg you need three spoonful's of flour' •

#### Geometry:

Illustrate and name parts of circles, including radius, diameter and circumference.

	Statistics and Mean average
	Cross Curricular Opportunity!
<u>k</u>	<u>SPINE:</u>
	2.26 Mean average and equal shares
	Small Steps:
	1 Pupils explain the relationship between the mean and
	sharing equally
	2 Pupils explain how to calculate the mean of a set of data
	3 Pupils explain how the mean changes when the total
	quantity or number of values changes
	4 Pupils explain how to calculate the mean when one of the values in the data set is zero or missing
5	5 Pupils explain how to use the mean to make comparisons between two sets of information
	6 Pupils explain when the mean is not an appropriate
	representation of a set of data
۱,	
	Line graphs
	• Line graphs are used to represent continuous
;	data; time, length, etc. and to show conversion
	rates (e.g. kilometres to miles)
_	• Reading scales/number lines with labelled
5	intervals is covered in Year 6, Unit 3. Pupils should
	practise reading measurement and graphing
	scales with labelled power-of-10 intervals divided
	into 2, 4, 5 and 10 equal parts. They should use
	their knowledge of scales to create the
	appropriate graph for the data presented. Ensure
	that the children are able to find points that are
	haltway between intervals.
•	
	<u>NC:</u> Calculate and intermediate meanings on events
	Calculate and interpret the mean, as an average.
	nice preciand construct line graphs and use these to solve problems (conversion of units for measures)