## VALENCE PRIMARY SCHOOL-CALCULATION POLICY

2017/18 Year 1, Year 2 and Year 3



## Aims-Based on the 2014 New Curriculum

## To ensure that pupils

- become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately
- reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions

Addition				
Year 1	Year 2	Year 3		
Mental/Written Strategies <ul> <li>Experience, regular counting on and back</li> </ul>	Mental/Written Strategies	<u>Mental/Written Strategies</u>		
from different numbers in 1s and in multiples of 2, 5 and 10.	<ul> <li>Count regularly, on and back, in steps of 2, 3, 5 and 10. Count forwards in tens from any number</li> </ul>	<ul> <li>Count regularly, on and back, now including multiples of 4, 8, 50, and 100, and steps of 1/10.</li> </ul>		
Memorise and reason with number bonds				
for numbers to 20, experiencing the = sign in different positions.	<ul> <li>Begin to use 'empty number lines' themselves starting with the larger number and counting on. 56 + 33</li> </ul>	<ul> <li>The number line should continue to be used as an important image to support thinking, and the use of informal jottings should be encouraged.</li> </ul>		
<ul> <li>Practical methods using bead strings or number lines can be used to illustrate</li> <li>addition by counting on from the biggest</li> </ul>	+ 30 + 3	• Partition numbers in different ways e.g.		
number e.g. 5 + 3 (count on in ones)	56 86 89	353 + 126		
		300 + 100=400		
	Number lines should continue to be an important image	50 + 20 = 70		
	to support mathematical thinking, for example to model how to add 9 by adding 10 and adjusting.	400 + 70 + 9 = 479		
	+10	Choose mental strategies which are most		
<ul> <li>See addition and subtraction as related operations E a. 7 + 3 = 10 is related to 10 -</li> </ul>		efficient for the numbers involved, e.g.		
3 = 7,	35 44 45	• Add the nearest multiple of 10, then adjust		
2	-1 Pontitioning	such as 63 + 29 is the same as 63 + 30 - 1;		
	rainnoning			
	56 + 33	Vertical column metrica		
10 = 7 + 3	50 + 30= 80	22.109 + 4. 25		
	6 + 3 = 9	22 .109		
	80 + 9 = 89	+4 . 25		
<ul> <li>Use bundles of straws and Dienes to model partitioning teen numbers into tens and ones and develop understanding of place</li> </ul>	<ul> <li>Practise addition to 20 to become increasingly fluent.</li> </ul>	26. 359		

Subtraction			
Year 1	Year 2	Year 3	
Mental/Written Strategies	Mental/Written Strategies	<u>Mental /Written Strategies</u>	
<ul> <li>Children should memorise and reason with number bonds for numbers to 20, experiencing the = sign in different positions.</li> </ul>	<ul> <li>Number lines should continue to be an important image to support thinking</li> <li>Use the facts they know to derive others, e.g</li> </ul>	<ul> <li>Children will continue to use empty number lines with increasingly large numbers.</li> <li>Children will begin to use informal pencil and paper</li> </ul>	
<ul> <li>See addition and subtraction as related operations. E.g. 7 + 3 = 10 is related to 10 - 3 = 7 understanding of which could be</li> </ul>	using 10 - 7 = 3 and 7 = 10 - 3 to calculate 100 - 70 = 30 and 70 = 100 - 30.	methods (jottings). As in year 2 but with appropriate numbers	
supported by an image like this.	<ul> <li>As well as number lines, 100 squares could be used to model calculations such as 74 - 11, 77</li> <li>9 or 36 - 14, where partitioning or adjusting are used. On the example above, 1 is in the bottom left corner so that 'up' equates to</li> </ul>	Partitioning and decomposition • Partitioning – demonstrated using arrow cards • Decomposition - base 10 materials	
	'add'.	Use known number facts and place value to	
	<ul> <li>They should continue to see subtraction as both take away and finding the difference, and should find a small difference by counting up.</li> </ul>	Subtract. Continue as in year 2 but with appropriate numbers. e.g. 3-digit number take away 2-digit number. Estimate first e.g. 467 – 15 = 182	
<ul> <li>Use of straws and Dienes to model partitioning teen numbers into tens and ones.</li> </ul>	<ul> <li>They should use Dienes to model partitioning into tens and ones and learn to partition numbers in different ways e.g. 123 = 100 + 20 + 3</li> </ul>	452 457 467	
<ul> <li>Understand subtraction as both taking away</li> </ul>		-5 - 10	
and finding the difference between, and	column subtraction:	Subtract numbers with 3-digits using formal	
should find small differences by counting on.	-13	decomposition	
		308 - 73 = 235	
	14	<sup>2</sup> 3 <sup>1</sup> 08	
		<u>- 73</u>	
	Veeebulenv	<u>235</u>	
	Subtraction, subtract, take away, difference,		
	difference between, minus		
	Tens, ones, partition		
	Near multiple of 10, tens boundary		
	Less mun, one less, two less ten less one nundred		

Multiplication				
Year 1	Year 2	Year3		
Mental Strategies         Children should experience regular counting on and back from different numbers in 1s and in multiples of 2, 5 and 10.         They will work on practical problem solving activities involving equal sets or groups.         Image: Strategies of the solution of the s	Mental StrategiesChildren should count regularly, on and back, in stepsof 2, 3, 5 and 10.Number lines and bead strings should continue to bean important image to support thinking, for example $5 \times 3 = 5 + 5 + 5$ $5 \times 3 = 5 + 5 + 5$ $5 \times 3 = 5 + 5 + 5$	Mental StrategiesChildren should continue to count regularly, on and back, now including multiples of 4, 8, 50, and 100, and steps of 1/10.The number line should continue to be used as an important image to support thinking, and the use of informal jottings and drawings to solve problems should be encouraged.E.g.4 $\times$ 6 is 6 + 6 + 6 + 6 = 24 or 4 lots of 6 or 6 $\times$ 4		
Children should memorise and reason with numbers in 2, 5 and 10 times tables They should see ways to represent odd and even numbers. This will help them to understand the pattern in numbers	and on a bead string: 5 x 3 = 5 + 5 + 5 Children should practise times table facts	6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6		
Children should begin to understand multiplication as scaling in terms of double and half. (e.g. that tower of cubes is double the height of the other tower) <u>Vocabulary</u> Ones, groups, lots of, doubling repeated addition groups of, lots of, times, columns, rows longer, bigger, higher etc	2 x 1 = 2 x 2 = 2 x 3 = Use a clock face to support understanding of counting in 5s. Use money to support counting in 2s, 5s, 10s, 20s, 50s Repeated addition can be shown easily on a number line:	9 × 4 = 36 9 × 4 = 36 Children should practise times table facts <u>Vocabulary</u>		
<u>Generalisations</u> Understand 6 counters can be arranged as 3+3 or 2+2+2 Understand that when counting in twos, the numbers are always even.	<u>Vocabulary</u> multiple, multiplication array, multiplication tables / facts groups of, lots of, times, columns, rows	Partition grid method inverse <u>Generalisations</u> Connecting x2, x4 and x8 through multiplication facts		

Division				
Year 1	Year 2	Year 3		
Mental /written Strategies	Mental /written Strategies	Mental /written Strategies		
They should begin to recognise the number of groups counted to support understanding of relationship between multiplication and division. $\begin{array}{c} 2+2+2+2+2=10\\ 2\times 5=10\\ 2 \text{ multiplied by 5}\\ 5 \text{ mirs}\end{array}$	of 2, 3, 5 and 10. 18 pencils shared between 3 people, how many in each pot?	Children will make use multiplication and division facts they know to make links with other facts. $3 \times 2 = 6, 6 \div 3 = 2, 2 = 6 \div 3$ $30 \times 2 = 60, 60 \div 3 = 20, 2 = 60 \div 30$ They should be given opportunities to solve grouping and sharing problems practically (including where		
Children should begin to understand division as both sharing and grouping.		there is a remainder but the answer needs to given as a whole number) e.g. Pencils are sold in packs of 10. How many packs will I need to buy for 24 children?		
Sharing – 6 sweets are shared between 2 people. How many do they have each?	18÷3 can also be modelled as how many 3 are in 18	Children should be given the opportunity to further develop understanding of division (sharing) to be used to find a fraction of a quantity or measure.		
• • • • • • • • • • • • • • • • • • •		fractions as an answer to a sharing problem.		
How many 2's are in 6?	Children should be given opportunities to find a half a	3 apples shared between 4 people = 7		
	quarter and a third of shapes, objects, numbers and quantities. Finding a fraction of a number of objects to be related to sharing	Vocabulary See Y1 and Y2		
to develop understanding of division in a practical sense.	They will explore visually and understand how some	inverse		
E.g. using Numicon to find out how many 5's are in 30? How many pairs of gloves if you have 12 gloves?	same as one half.	Generalisations Inverses and related facts – develop fluency in finding related multiplication and division facts.		
Children should begin to explore finding simple fractions of objects, numbers and quantities.	<u>Vocabulary</u> group in pairs, 3s 10s etc	Develop the knowledge that the inverse relationship can be used as a checking method.		