

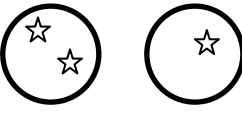

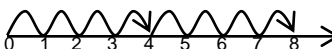
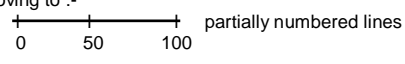
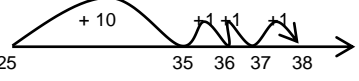
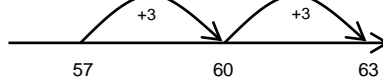
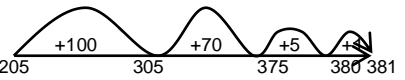
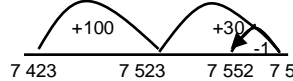
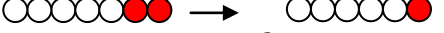

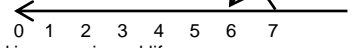
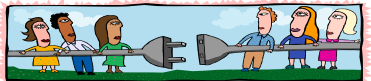


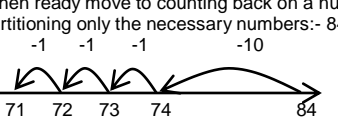

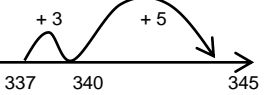
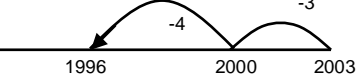
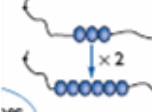
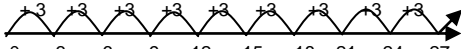



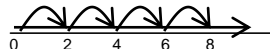

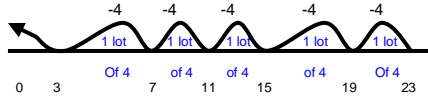


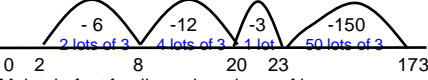



# Whole School Approach to Calculations Burton Bradstock Primary

Vocabulary	Year R/1	Year 1/2	Year 3/4	Year 5/6
<b>Underlying mental facts</b>	<b>As outcomes, Year R/1 pupils should, for example:</b> Develop number bonds for all numbers up to 5 and of 10. Reinforce in Y1. Develop counting on and back and then complementary subtraction facts. No.s to 100, calculate to 30	<b>As outcomes, Year 1/2 pupils should, for example:</b> Develop number bonds for 6 7 8 9 10 in Y1 and then up to and including 20 in Y2. Develop counting on and back and complementary subtraction facts. Calculate to 100s	<b>As outcomes, Year 3/4 pupils should e.g.:</b> Develop no. bonds for 100, multiples of 5 to 100, then multiples of 10 to 1000. Count on and back and develop complementary subtraction facts. Explore no.s to 1000s, Y3 calculate 3 digits and Y4 calculate 4 digits. Include negative and fractional numbers.	<b>As outcomes, Year 5/6 pupils should e.g.:</b> Develop no. bonds to 1000 and decimals to 10. In Y6 develop decimal number bonds to 1. Count on and back and develop complementary subtraction facts. Y5 1,000,000 Y6 10million
Adding + Sum + Total + Increase + Plus + Altogether + Counting on	Developing maths through practical and real life opportunities including topic, story, welly walks, PE, cooking, games and music. Sorting and modelling number sentences. <b>Approximate first.</b>  +  =  How many altogether? Can you find one more?  Moving to numbered lines when ready  Use Numicon imagery to support number understanding.	Developing and building on mental strategies, explaining orally e.g. combining 2 sets and showing stories as number sentences, looking for pairs of numbers that make 10. Introduce +/- symbols. <b>Approximate first.</b> Explore commutativity. Moving to :-  partially numbered lines 0 _____ Moving to blank numberlines. Finding the largest number to put first :- ●●●●●● Adding from the largest number first partitioning the second number:- 25 + 13 (25 + 10 + 1 + 1 + 1)  Bridging through a multiple of 10 by partitioning:- 57 + 6 into 57+3+3  Partitioning into tens and units 25 + 13 becomes 20 + 10 with 5 + 3 which is 30 + 8 = 38 Use Numicon imagery to support understanding.	Continue building on existing mental strategies, explaining orally and some use of negative numbers in context. <b>Approximate first. Establish checking procedures.</b> Use worded problems. Y3 = 3 dig Y4= 4 dig Partition into T and U to support mental methods:- 37+45 → 30+40 = 70 7+ 5 = 12 → 70 + 12 = 82 Maintain use of inverses through empty box sentences:- 37 + <input type="text"/> = 82 Continue supporting mental methods using blank numberlines:-205 + 176 = 381  Develop horizontal expanded addition (least significant digit first) as a written method. $\begin{array}{r} 200 & 30 & 7 \\ + & 100 & 40 & 5 \\ \hline 300 & 70 & 12 & = 382 \end{array}$ Count on to establish total Contract to standard algorithm when pupils ready:- $\begin{array}{r} 237 \\ + 145 \\ \hline 382 \end{array}$ Ensure pupils understand place value involved in carrying Use Deines imagery to support understanding.	<b>Maintain mental strategies, checking procedures. Approximate first.</b> Use many worded problems. Calculating to TTh, HTh, millions Maintain empty box sentences and numberlines with partitioning, negative numbers and decimals. Use to calculate time duration 7 423 + 129  7 423      7 523      7 552      7 553 <b>Visualise when ready.</b> Expanded horizontal adding least significant digits first. 4+ digits whole no. moving to decimals and 3dp $\begin{array}{r} 7000 & 500 & 80 & 7 \\ + & 600 & 70 & 5 \\ \hline 8000 & 200 & 60 & 2 \\ \hline 1000 & 100 & 10 & \end{array}$ Contract to standard written method as pupils ready: $\begin{array}{r} 7376 \\ + 439 \\ \hline 7815 \\ \hline 11 \end{array}$ Extend method to mixed decimals, converting decimals to fractions:- 2.4 + 3.6 becomes: 24 tenths + 36 tenths=60 tenths (6 units).
Subtract - Find the difference - Minus - Take away - Counting back - Less than	See notes above. Count back to take away and count on to find out how many more than. Start with selves and objects moving gradually to bead strings then numbered lines to find 1 less than:-  →   Taking away in real life:- 6 children playing Tug of War. Three fall over! How many are left standing?  Sandy blows 8 bubbles  2 pop! How many are left?	See notes above. Count back on numberlines to take away and count up to find the difference. Starting with objects moving gradually to bead strings to find 1 then 10 less than  When ready move to counting back on a numberline by partitioning only the necessary numbers:- 84 - 13 =  Comparing to find the difference:-  Develop fact families for inverses:- 3 + 17 = 20 so 17 + 3 = 20 and 20 - 3 = 17 and also 20 - 17 = 3 Explore why subtraction is not commutative.	See notes above. Maintain counting back to take away. Count on to find the difference using empty numberlines, bridging through 10 initially:- 345 - 337 = 337 + 3 + 5 The difference is 8  Explore, choosing the most efficient strategy for the numbers involved. Start to develop a horizontally expanded written method without decomposition:- 167-54 $\begin{array}{r} 100 & 60 & 7 \\ - & 50 & 4 \\ \hline 100 & 10 & 3 & = 113 \end{array}$ Count on to establish total and contract when ready. Include decomposition. Support with arrow cards and deines apparatus. Incl decomposition when ready	See notes above. Maintain use of empty numberlines to support mental calculation for counting on and back Use numberlines to cross thousands boundaries:- 2003 - 7  1996      2000      2003 Revisit written methods including decomposition, first expanded then compacted as pupils become ready:- 2793 - 148 $\begin{array}{r} 2000 & 700 & 90 & 3 \\ - & 100 & 40 & 8 \\ \hline 2000 & 600 & 40 & 5 \end{array}$ $\begin{array}{r} 81 \\ 2793 \\ - 148 \\ \hline 2645 \end{array}$ Extend to subtraction of decimals.

# Whole School Approach to Calculations Burton Bradstock Primary

Vocabulary	Year R/1	Year 1/2	Year 3/4	Year 5/6												
	<b>As outcomes, Year R/1 pupils should, for example:</b>	<b>As outcomes, Year 1/2 pupils should, for example:</b>	<b>As outcomes, Year 3/4 pupils should e.g.:</b>	<b>As outcomes, Year 5/6 pupils should e.g.:</b>												
<b>Underlying mental facts</b>	Develop tables facts for 2 then in Y1 for 5 and 10 <b>using shapes to help visual learners</b> . Secure so chn have rapid recall of these facts and use to find and learn division facts. Count back and forth in repeated steps of 2 in Yr moving to steps of 5 and 10 in Y1.	Develop tables facts for 5 and 10 in Y1 then in Y2 for 3 and 4 <b>using shapes to help visual learners</b> . Secure so chn have rapid recall of these facts and use to find and learn division facts. Count back and forth in repeated steps of 5 and 10 in Y1 moving to 3 and 4 in Y2.	Develop tables facts for 6, 8, 9 and 7, 11 and 12 times table. Secure so chn have rapid recall of these facts and use to find and learn division facts. Count on and back in repeated steps of 6, 8, 9, 12, 7 and 11. Develop $x \div$ by 10 and then by 100, 0+1	Secure rapid recall of <b>all</b> multiplication and division facts up to $12 \times 12$ and develop table facts up to $20 \times$ alongside squared, cubed, prime and triangular no.s. Count on and back in repeated steps of any size including decimal steps and fraction steps. Develop $x \div$ by 1000 and then by 0.1												
Multiplication Arrays	Develop concept of equal groups through looking at equal groups in the real world moving to partitioning sets of objects into <b>equal</b> 'lots of'.	Building on existing ideas, explain orally and keep focus on <b>equal</b> 'lots of'. Use word problems.	Build on existing ideas, maintaining explanations and word problems Consolidating EQUALITY of groups.	Build on existing ideas, maintaining and developing the grid method and arrays.												
X	Equal groups:- socks come in equal group of 2s, every glove has an equal group of 5 fingers, so if I have 2	Practically double numbers up to 20 and record in number sentences:-	Count on to link repeated addition to multiplication based on times table facts:- $9 \times 3 = 27$ etc	HTU x TU, HTU x HTU, ThHTU x U and decimals												
Double	gloves, I have 2 equal groups of 5.	 2 equal groups of 3 are 6. $3 \times 2 = 6$ linking '2 lots of 3' to repeated addition $3 + 3 = 6$ .	 0 3 6 9 12 15 18 21 24 27	$246.7 \times 7$												
X	10 is 5 and 5 more $10 = 5 + 5$	Introduce x symbol.	Continue to develop rectangular arrays consolidating understanding that multiplication can be done in any order and is all about EQUAL groups:-	<table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td>X</td><td>200</td><td>40</td><td>6</td><td>0.7</td></tr><tr><td>7</td><td>1400</td><td>280</td><td>42</td><td>0.49</td></tr></table> = 1722.49	X	200	40	6	0.7	7	1400	280	42	0.49		
X	200	40	6	0.7												
7	1400	280	42	0.49												
Product	5+5 beginning to understand double as being the same as adding 5 twice.	Further develop idea of repeated addition as multiplying:- 5 added 3 times is $5 + 5 + 5$ or 3 equal lots of 5 or 3 times 5 or $5 \times 3$		Maintain mental strategies:- factorising $567 \times 20 = (567 \times 2) \times 10$ distributive $274 \times 11 = (274 \times 10) + (274 \times 1)$												
X		Support with practical work and rectangular arrays:-	Introduce grid method TU x U counting on orally	Develop short multiplication standard written method:-												
Times X	 Use arrays to support understanding.	 $4 \times 2 = 8$ $2 \times 4 = 8$	<table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td>x</td><td>20</td><td>7</td></tr><tr><td>5</td><td>100</td><td>35</td></tr><tr><td>6</td><td></td><td></td></tr></table> $\rightarrow 100 + 35 = 135$	x	20	7	5	100	35	6			$126 \times 4.8$ then long multiplication $567 \times 3$			
x	20	7														
5	100	35														
6																
Equal lots of/sets of/groups of	If there are 8 of us and we all have 2 legs. How many legs are there altogether?	Explore the concept that multiplication can be done in any order and model on a numberline.	Develop the grid method TU x TU and HTU x U	<table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td><math>\frac{567}{3}</math></td><td><math>\frac{4.8}{2}</math></td><td><math>\frac{567}{11}</math></td></tr><tr><td>378</td><td>14.4</td><td>11340</td></tr></table>	$\frac{567}{3}$	$\frac{4.8}{2}$	$\frac{567}{11}$	378	14.4	11340						
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378	14.4	11340														
X		 0 2 4 6 8	<table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td>10</td><td>300</td><td>20</td><td>320</td></tr><tr><td>4</td><td>120</td><td>8</td><td>+ 128</td></tr><tr><td></td><td></td><td></td><td>448</td></tr></table> $\rightarrow 320, 420, 440, 448$	10	300	20	320	4	120	8	+ 128				448	Count on orally – $320, 420, 440, 448$
10	300	20	320													
4	120	8	+ 128													
			448													
Multiples	 Teddies have 2 badges on their jumpers. How many teddies' jumpers could we make with 10 badges?	Use Numicon for repeated addition and subtraction.	Move to long multiplication during Y4 when ready													
X																
Repeated addition																
Division	See above. Link division to multiplication.	See above. Maintain practical division reinforcing equal groups in both sharing and grouping eg how many cars can be constructed using equal groups of 4 wheels per car if I have 23 wheels? 5 cars with 3 left over wheels.	Maintain practical sharing. Focus on division as grouping, including remainders.	Develop rules of divisibility for 2, 4, 8, 5, 10, 3, 6, 9 and reinforce link with multiplication to support mental strategies. Chunk using multiples of the divisor vertically HTU $\div$ TU using Top Tips + chunking of 4-dig $\times$ 2 - dig												
$\div$	Practical division as sharing:- When we share 6 sweets equally between 3 plates, there are 2 sweets on each.	 0 3 7 11 15 19 23	$TU \div U \quad 37 \div 2 = 18$ lots of 2 with 1 left over	$977 \div 36$ <b>Top Tips</b> – 1 36 2 72 so 20 lots = 720 4 144 10 360 (and use to derive 5 180 new info)												
Halve		Link to <b>repeated subtraction</b> :- 6 crackers shared equally between 2 plates = 3 each	Develop HTU $\div$ U and Top Tips $173 \div 3$ What do we already know about equal groups of 3?... If I know 1 lot of 3 is 3 then I can work out (double) 2 lots of 3 is 6 (double) 4 lots of 3 is 12 (x 10) 10 lots of 3 is 30 (halve) 5 lots of 3 is 15 and then I know that $50 \times 3 = 150$	moving to:- $977 - 360$ 10 lots $617 - 360$ 10 lots $257 - 180$ 5 lots $77 - 72$ 2 lots 5												
$\div$		I take away 1 from the 6 crackers for the first plate, then I take away 1 from the remaining 5 crackers for the second plate...	$173 \div 3 = 57$ r2	$10 \times 36 = 360$ $10 \times 36 = 360$ $5 \times 36 = 180$ $2 \times 36 = 72$												
Factors	Practical dividing into equal groups of :-	'There are 18 apples in a box. How many bags of 6 apples can be filled?'  = 3	 0 2 8 20 23 173	Answer: $27 \frac{5}{36}$ or $27 \frac{5}{121}$ r5												
$\div$	We have 10 socks and we know they come in equal groups of 2. How many pairs can we make?	Develop fact family explicit linking of multiplication and division e.g. $2 \times 3 = 6$ so $6 \div 3 = 2$ and also $3 \times 2 = 6$ and $6 \div 2 = 3$	Maintain fact family work and use of inverses.	Short division in Y5, Introduce BODMAS $4 \overline{)1484}$												
Equal lots of/groups			Use and apply in word problems rounding up and down for context (Level 3). Including calculator use.													
$\div$			Move to vertical presentation during Y4.													
Repeated subtraction	Use Arrays to support understanding.															