

Horton Park Primary School

Mental Calculation Policy



Horton Park Primary

We Learn to Succeed

September 2014

Reviewed – September 2016

	Recall: Children should be able to derive and recall:	Mental Calculation skills: Working mentally, with jottings if needed, children should be able to:	Mental methods or strategies: Children should understand when to and be able to apply these strategies:
Year 1			
Adding and subtracting pairs of numbers	<ul style="list-style-type: none"> • Number pairs with a total of 10, e.g. 3+7, or what to add to a single-digit number to make 10, e.g. $3+\Delta=10$ • Addition facts for totals to at least 5, e.g. 2+ 3, 3+4 	<ul style="list-style-type: none"> • Add or subtract a pair of single-digit numbers, e.g. 4+5, 8-3 • Add or subtract a single-digit number to or from a teens number, e.g.13-5, 17-3 • Add or subtract a single-digit to or from 10, and add a multiple of 10 to a single-digit number, e.g. 10+7, 7+30 	<ul style="list-style-type: none"> • Reorder numbers when adding, e.g. put the larger number first • Count on or back in ones, twos or tens • Partition small numbers, e.g. $8+3=8+2+1$ • Partition and combine tens and ones

Doubling numbers	<ul style="list-style-type: none"> Addition doubles for all numbers to at least 10, e.g. $8+8$ 	<ul style="list-style-type: none"> Add near doubles, e.g. $6+7$ 	<ul style="list-style-type: none"> Partition: double and adjust, e.g. $5+6=5+5+1$
Number sequences	<ul style="list-style-type: none"> Odd and even numbers to 20 	<ul style="list-style-type: none"> Count on and back to 0 in ones, twos, fives or tens 	<ul style="list-style-type: none"> Use patterns of last digits, e.g. 0 and 5 when counting in fives
Year 2			
Adding and subtracting pairs of numbers	<ul style="list-style-type: none"> Addition and subtraction facts for all numbers up to at least 10, e.g. $3+4$, $8-5$ Number pairs with totals to 20 	<ul style="list-style-type: none"> Add or subtract a pair of single-digit numbers including crossing 10, e.g. $5+8$, $12-7$ Add or subtract a single-digit number to or from a two-digit number, including crossing the tens boundary, e.g. $52-7$ 	<ul style="list-style-type: none"> Reorder numbers when adding Partition: bridge through 10 and multiples of 10 when adding or subtracting
Calculations using multiples of tens	<ul style="list-style-type: none"> All pairs of multiples of 10 with totals up to 100, e.g. $30+70$, 	<ul style="list-style-type: none"> Add or subtract any single-digit number to or from a multiple of 10, e.g. $60+5$, 	<ul style="list-style-type: none"> Partition and combine multiples of tens and ones

	<p>or $60 + \Delta = 100$</p> <ul style="list-style-type: none"> • What must be added to any 2-digit number to make the next multiple of 10, e.g. $52 + \Delta = 60$ 	<p>$80 - 7$</p> <ul style="list-style-type: none"> • Add or subtract a multiple of 10 to or from any two-digit number, e.g. $27 + 60$, $72 - 50$ • Add 9, 19, etc or 11, 21, etc 	<ul style="list-style-type: none"> • Use knowledge of pairs making 10 • Count on in tens or ones to find totals • Count on or back in tens or ones to find the difference • Partition: add a multiple of 10 and adjust by 1
Doubling and halving	<ul style="list-style-type: none"> • Addition doubles for all numbers to 20, e.g. $17 + 17$ and multiples of 10 to 50, e.g. $40 + 40$ and all corresponding halves 	<ul style="list-style-type: none"> • Double any multiple of 5 up to 50, e.g. double 35 • Add near doubles, e.g. $13 + 14$ • Find half of even numbers to 40 	<ul style="list-style-type: none"> • Partition: double the tens and ones separately, then recombine • Partition: double and adjust • Use knowledge that halving is the inverse of doubling and that doubling is equivalent to multiplying by two

<p>Multiplication and division facts</p>	<ul style="list-style-type: none"> • Multiplication facts for the 2, 5 and 10 times-tables and corresponding division facts • Odd and even numbers to 100 	<ul style="list-style-type: none"> • Find the total number of objects when they are grouped into 2, 5 or 10 	<ul style="list-style-type: none"> • Use knowledge of multiplication facts from the 2, 5 and 10 times-tables, e.g. recognise that there are 15 objects altogether because there are 3 groups of 5
<p>Year 3</p>			
<p>Adding and subtracting pairs of numbers</p>	<ul style="list-style-type: none"> • Addition and subtraction facts for all numbers to 20, e.g. 17-9, drawing on knowledge of inverse operations 	<ul style="list-style-type: none"> • Add and subtract groups of small numbers, e.g. 5-3+2 • Add and subtract 2-digit numbers, e.g. 34+65 	<ul style="list-style-type: none"> • Reorder numbers when adding • Partition: count on in tens and ones to find the total • Partition: count on or back in tens and ones to find the difference • Use knowledge that halving is the inverse of doubling

<p>Calculations involving tens (and multiples of ten) and hundreds</p>	<ul style="list-style-type: none"> • Sums and differences of multiples of 10, e.g. $50+80$ • Pairs of 2-digit numbers with a total of 100, e.g. $32+68$ 	<ul style="list-style-type: none"> • Add or subtract a 2-digit number to or from a multiple of 10, e.g. $50-38$ • Multiply 1-digit or 2-digit numbers by 10 or 100, e.g. 46×10 	<ul style="list-style-type: none"> • Identify pairs totalling 10 or multiples of 10 • Partition: add or subtract 10 or 20 and adjust • Recognise that when multiplying by 10 or 100 the digits move one or two places to the left and 0 is a place holder
<p>Doubling and halving</p>	<ul style="list-style-type: none"> • Addition doubles for multiples of 10 to 100, e.g. $90+90$ and corresponding halves 	<ul style="list-style-type: none"> • Add near doubles, e.g. $18+16$ • Double any multiple of 5 up to 100, e.g. double 35 • Halve any multiple of 10 up to 200, e.g. halve 170 	<ul style="list-style-type: none"> • Partition: add, double or halve tens and ones separately then recombine • Partition: double and adjust

Time			<ul style="list-style-type: none"> Partition: count on or back in minutes and hours, bridging through 60 (analogue)
Multiplication and division facts	<ul style="list-style-type: none"> Multiplication facts and corresponding division facts for 2, 3, 4, 5, 6, and 10 times-tables 	<ul style="list-style-type: none"> Find unit fractions of numbers and quantities involving halves, thirds, quarters, fifths and tenths 	<ul style="list-style-type: none"> Recognise that finding a unit fraction is equivalent to dividing by the denominator and use knowledge of division facts
Year 4			
Calculations involving tens, hundreds and thousands	<ul style="list-style-type: none"> Sums and differences of pairs of multiples of 10, 100, 1000 What must be added to any 3-digit number to make the next multiple of 100, e.g. $521 + \quad = 600$ 	<ul style="list-style-type: none"> Add or subtract a near-multiple of 10, e.g. $56 - 29$ Add or subtract 2-digit or 3-digit multiples of 10, e.g. $140 + 170$ Multiply and divide numbers to 1000 by 10 and then 100, 	<ul style="list-style-type: none"> Count on or back in hundreds, tens, ones Add or subtract a multiple of 10 and adjust, e.g. $56 - 29 = 56 - 30 + 1$ Use knowledge of place value and related calculations,

		<p>e.g. 850 divided by 10</p> <ul style="list-style-type: none"> • Multiply a multiple of 10 to 100 by a single digit number , e.g. 40×3 	<p>e.g. $140 + 150 = 290$ using $14 + 15 = 19$</p> <ul style="list-style-type: none"> • Use understanding that when a number is multiplied or divided by 10 or 100, its digits move one or two places to the left of the right and 0 is used as a place holder • Use knowledge of multiplication facts and place value, e.g. $7 \times 8 = 56$ to find 70×8 or 7×80
<p>Adding and subtracting 2-digit numbers</p>	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> • Add or subtract any pair of 2-digit numbers, including crossing the tens and 100 boundary, e.g. $47 + 58$ 	<ul style="list-style-type: none"> • Partition: add tens and ones separately and recombine • Partition: subtract tens and then ones, e.g. subtracting 27 by subtracting 20 then 7

			<ul style="list-style-type: none"> • Subtract by counting up from the smaller to the larger number
Doubling and halving	<ul style="list-style-type: none"> • Doubles of multiples of 10 and 100 and corresponding halves • Addition doubles of numbers 1 to 100, e.g. $38+38$ and the corresponding halves 	<ul style="list-style-type: none"> • Halve any even number to 200 • Add near doubles of 2-digit numbers, e.g. $38+37$ 	<ul style="list-style-type: none"> • Partition: double/halve tens and ones separately, recombine and adjust
Time			<ul style="list-style-type: none"> • Partition: count on or back in minutes and hours, bridging through 60 (analogue and digital)
Multiplication and division facts	<ul style="list-style-type: none"> • Multiplication facts to 10×10 and the corresponding division facts • Factor pairs for known multiplication 	<ul style="list-style-type: none"> • Multiply numbers to 20 by a single digit, e.g. 17×3 • Identify remainders when dividing by 2, 5, 10 	<ul style="list-style-type: none"> • Use partitioning and the distributive law to multiply, e.g. $13 \times 4 = (10 \times 4) + (3 \times 4)$

	facts	<ul style="list-style-type: none"> • Give the factor pair associated with a multiplication fact , e.g. $2 \times 3 = 6$ so 2 and 3 are factors 	
Fractions and decimals	<ul style="list-style-type: none"> • Fraction and decimal equivalents of one half, quarters, tenths, and hundredths • Pairs of fractions that total 1 	<ul style="list-style-type: none"> • Find unit fractions and simple non-unit fractions of numbers and quantities, e.g. $\frac{3}{8}$ of 24 	
Year 5			
Decimals, fractions and percentages	<ul style="list-style-type: none"> • Sums and differences of decimals, e.g. $6.5 + 2.7$ • What must be added to a decimal with units and tenths to make the next whole number, e.g. $7.2 + ? = 8$ • Related unit fractions 	<ul style="list-style-type: none"> • Add or subtract any pairs of decimals with units and tenths, e.g. $5.7 - 2.9$ • Find fractions of whole numbers or quantities, e.g. $\frac{2}{3}$ of 70kg • Find 50%, 25%, 10% of whole 	<ul style="list-style-type: none"> • Use knowledge of place value and related calculations, e.g. $6.3 - 4.8$ using $63 - 48$ • Subtract by counting up from the smaller number to the larger number

	<p>of multiplication/division facts, e.g. $1/9$ of 63 is 7</p> <ul style="list-style-type: none"> Percentage equivalents of one half, one quarter, three quarters, tenths and hundredths 	<p>numbers or quantities, e.g. 10% of £80</p>	<ul style="list-style-type: none"> Use knowledge of equivalence between fractions and percentages
<p>Calculations involving multiples of 10, 100, 1000</p>	<ul style="list-style-type: none"> What must be added to any 4-digit number to make the next multiple of 1000, e.g. $4087 + ? = 5000$ 	<ul style="list-style-type: none"> Add or subtract a pair of 2-digit numbers or 3-digit multiples of 10, e.g. $47+86$ or $620-240$ Add or subtract a near-multiple of 10 or 100 to any 2-digit or 3-digit number, e.g. $235-198$ Find the difference between near multiples of 100, e.g. $607-588$, or of 	<ul style="list-style-type: none"> Count on or back in hundreds, tens, ones and tenths Partition: add hundreds, tens, ones separately and recombine Add or subtract a multiple of 10 or 100 and adjust Form an equivalent calculation, e.g. to multiply by 5, multiply by 10 then

		<p>1000, e.g. 6070-4087</p> <ul style="list-style-type: none"> • Multiply 2-digit numbers by 5 or 20, e.g. 14x20 • Multiply by 25 or 50, e.g. 48x25 • Multiply and divide whole numbers and decimals by 10, 100 or 1000 • Multiply pairs of multiples of 10, e.g. 60x30, and a multiple of 100 by a single digit, e.g. 900x8 • Divide a multiple of 10 by a single digit 	<p>halve</p> <ul style="list-style-type: none"> • Use understanding that when a number is multiplied or divided by 10 or 100, its digits move one or two places to the left of the right and 0 is used as a place holder • Use knowledge of multiplication and division facts and understanding of place value, e.g. when calculating with multiples of 10
Doubling and halving	<ul style="list-style-type: none"> • Doubles and halves of decimals 	<ul style="list-style-type: none"> • Double 3-digit multiples of 10 to 500, e.g. 380x2 and find corresponding 	<ul style="list-style-type: none"> • Multiply or divide by 4 or 8 by repeated doubling or halving • Partition: double

		<p>halves</p> <ul style="list-style-type: none"> • Multiply and divide 2-digit numbers by 4 or 8, e.g. 96 divided by 8 	and adjust
Time			<ul style="list-style-type: none"> • Partition: count on or back in minutes and hours, bridging through 60 (analogue and digital)
Multiplication and division facts	<ul style="list-style-type: none"> • Squares to 10x10 • Factor pairs to 100 	<ul style="list-style-type: none"> • Find the remainder after dividing a 2-digit by a single digit number • Find factor pairs for numbers to 100 	<ul style="list-style-type: none"> • Use knowledge of division facts to find a remainder • Use knowledge of multiplication and division facts to find factor pairs
Year 6			
Addition and subtraction facts		<ul style="list-style-type: none"> • Add or subtract pairs of decimals with units, tenths or hundredths 	

		<ul style="list-style-type: none"> • Add or subtract a decimal with units and tenths that is nearly a whole number, e.g. $6.5 - 3.8$ 	
<p>Calculations involving tenths, hundredths, multiples of 10 and 100, etc</p>	<ul style="list-style-type: none"> • Addition and subtraction facts for multiples of 10 to 1000 and decimal numbers with one decimal place, e.g. $660 + ? = 930$, $? - 1.8 = 2.5$ • What must be added to a decimal with units, tenths and hundredths to make the next whole number, e.g. $7.26 + ? = 8$ • Squares of multiples of 10 • 	<ul style="list-style-type: none"> • Divide by 25 or 50, e.g. 2300 divided by 25 • Multiply pairs of multiples of 10 and 100, e.g. 50×30 • Divide multiples of 100 by a multiple of 10 or 100, e.g. 600 divided by 20 	<ul style="list-style-type: none"> • Count on or back in hundreds, tens, ones, tenths, hundredths • Use knowledge of place value and related calculations, e.g. $680 - 430$, $6.8 - 4.3$, $0.68 - 0.43$, etc can all be worked out from $68 - 43$ • Form an equivalent calculation, e.g. to divide by 25, divide by 100 then multiply by 4

Doubling and halving		<ul style="list-style-type: none">• Find doubles of decimals each with units and tenths• Add near doubles of decimals• Double decimals with units and tenths and the corresponding halves, e.g. half of 15.2	<ul style="list-style-type: none">• Partition: double and adjust• Partition: add or subtract a whole number and adjust, e.g. $4.3 - 2.9 = 4.3 - 3 + 0.1$
Time			<ul style="list-style-type: none">• Count on or back in minutes and hours, bridging through 60 (analogue, digital, 12 hour and 24 hour)

<p>Multiplication and division facts</p>	<ul style="list-style-type: none"> • Squares to 12x12 • Prime numbers less than 100 	<ul style="list-style-type: none"> • Multiply pairs of 2-digit and single digit numbers • Divide a 2-digit number by a single digit number • Multiply and divide 2-digit decimals such as 4.8 divided by 6 • Identify numbers with odd and even numbers of factors and no factor pairs other than 1 and themselves • Scale up and down using known facts, e.g. 3 oranges cost 24p so 4 oranges cost ? 	<ul style="list-style-type: none"> • Partition: use partitioning and the distributive law to divide tens and ones separately, e.g. 94 divided by 4 = (80+12) divided by 4 • Recognise how to scale up or down using division or multiplication, e.g. 24p divided by 3 = 8, 4x 8 = 32p • Use knowledge of multiplication and division facts to identify factor pairs and numbers with only two factors
<p>Percentages and fractions</p>	<ul style="list-style-type: none"> • Equivalent fractions, decimals, percentages for 	<ul style="list-style-type: none"> • Find 10% or multiples of 10%, of whole numbers and 	<ul style="list-style-type: none"> • Use knowledge of the equivalence between fractions

hundredths

quantities

- Simplify fractions by cancelling

and percentages
and the relationship
between fractions
and division