

Woodseaves C.E Academy



Progression in Mental Calculation Skills

'Progression in Mental Calculation Skills' describes the progression in the number facts that children should derive and recall, the calculations that they are expected to do mentally and the range of calculation strategies or methods that they can draw on.

	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+△=10 • Addition and subtraction facts for all numbers up to at least 10, e.g. 3+4, 8-5 	<ul style="list-style-type: none"> • Add or subtract a pair of single-digit numbers within 20, e.g. 4+5, 8-3 • Add or subtract a single digit number to or from a teens number, within 20 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"> • Number pairs with totals to 20 • 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 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"> • Check subtraction calculations using addition calculations, by adding in a different order • 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. $30+70$, or $60+\Delta=100$ <ul style="list-style-type: none"> • What must be added to any 2-digit number to make the next multiple of 10, e.g. $52+\Delta=60$ 	<ul style="list-style-type: none"> • Add or subtract any single-digit number to or from a multiple of 10, e.g. $60+5$, $80-7$ • 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"> • Partition and combine multiples of tens and ones <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 <ul style="list-style-type: none"> • 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
Multiplication and division facts	<ul style="list-style-type: none"> • Multiplication facts for the 2, 5 and 10 times tables and corresponding division facts • Know multiplication facts up to 5×5 <ul style="list-style-type: none"> • Recognise 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 and all tables up to 5×5, e.g. recognise that there are 15 objects altogether because there are 3 groups of 5
Year 3			
Adding and subtracting numbers	<ul style="list-style-type: none"> • Add and subtract numbers mentally, including: <ul style="list-style-type: none"> - a three-digit number and ones - a three-digit number and tens - a three-digit number and hundreds 	<ul style="list-style-type: none"> • Add mentally three or more small numbers within the range 1 to 50 • Add and subtract 2-digit numbers, e.g. $34+65$ 	<ul style="list-style-type: none"> • Reorder numbers when adding <ul style="list-style-type: none"> • Partition: count on in tens and ones to find the total • Partition: count on or back in tens and ones to find the difference

		<ul style="list-style-type: none"> Respond rapidly to oral and written questions phrased in a variety of ways. 	<ul style="list-style-type: none"> Use knowledge that halving is the inverse of doubling
Calculations involving tens (and multiples of ten) and hundreds	<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. 46x10 	<ul style="list-style-type: none"> Recognise that when multiplying by 10 or 100 the digits move one or two places to the left and 0 is a place holder
Doubling and halving	<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
Multiplication and division facts	<ul style="list-style-type: none"> Calculate mentally using multiplication and division facts for the 3, 4 and 8 multiplication 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+ =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, e.g. 850 divided by 10 Multiply a multiple of 10 to 	<ul style="list-style-type: none"> Count in multiples of 1000; count backwards through zero to include negative numbers Use knowledge of place value and related calculations, e.g. 140+150=290 using 14+15=19 Divide a one- or two-digit numbers by 10 and 100, identifying the value of the digits in the

		100 by a single digit number , e.g. 40×3	answer as ones, tenths and hundredths <ul style="list-style-type: none"> • Use knowledge of multiplication facts and place value, e.g. $7 \times 8 = 56$ to find $70 \times 8 = 560$ or $700 \times 8 = 5600$
Adding and subtracting numbers	<ul style="list-style-type: none"> • Use addition and subtraction facts to 100 and derive related facts up to 1000 • Pairs of fractions that total 1 	<ul style="list-style-type: none"> • Use commutativity in mental calculations • Mentally add and subtract pairs of three-digit and four-digit numbers 	
Doubling and halving	<ul style="list-style-type: none"> • Addition doubles of numbers to 100, e.g. $38 + 38$, and the corresponding halves 	<ul style="list-style-type: none"> • Multiply or divide by 4 or 8 by repeated doubling or halving 	<ul style="list-style-type: none"> • Partition: double and adjust
Multiplication and division facts	<ul style="list-style-type: none"> • Recall multiplication and division facts for multiplication tables up to 12×12 	<ul style="list-style-type: none"> • Use factor pairs in mental calculations 	<ul style="list-style-type: none"> • Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers • Recognise and use factor pairs and commutativity in mental calculation
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. $7.2 + ? = 8$ 	<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 	<ul style="list-style-type: none"> • Use knowledge of place value and related calculations, e.g. $6.3 - 4.8$ using $63 - 48$ • Use knowledge of equivalence between fractions and percentages

	<ul style="list-style-type: none"> • Related unit fractions of multiplication/division facts, e.g. $\frac{1}{9}$ of 63 is 7 • Percentage equivalents of one half, one quarter, three quarters, tenths and hundredths 	<ul style="list-style-type: none"> • Find 50%, 25%, 10% of whole numbers or quantities, e.g. 10% of £80 	<ul style="list-style-type: none"> • Associate a fraction with division
Calculations involving 10, 100, 1000	<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"> • Partition: add hundreds, tens, ones separately and recombine • Add or subtract a multiple of 10, 100 or 1000 and adjust • Form an equivalent calculation, e.g. to multiply by 5, multiply by 10 then halve
Addition and Subtraction Doubling and halving	<ul style="list-style-type: none"> • Add and subtract numbers mentally with increasingly large numbers • Continue to develop knowledge of addition and subtraction facts and to derive related facts • Doubles and halves of decimals 	<ul style="list-style-type: none"> • Double 3-digit multiples of 10 to 500, e.g. 380×2 and find corresponding halves • Multiply and divide 2-digit numbers by 4 or 8, e.g. 96 divided by 8 	
Multiplication and division facts	<ul style="list-style-type: none"> • Identify multiples and factors, including all factor pairs of a number, and common factors of 2 numbers • Recall square numbers and cube numbers and the notation for them 	<ul style="list-style-type: none"> • Multiply and divide numbers mentally drawing upon known facts 	<ul style="list-style-type: none"> • Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000

	<ul style="list-style-type: none"> •Recall prime numbers up to 19 		
Year 6			
Addition and subtraction facts		<ul style="list-style-type: none"> •Perform mental calculations, including with mixed operations and large numbers •Consolidate knowledge of addition facts and the related subtraction facts, deriving further related facts as required 	<ul style="list-style-type: none"> • Partition: add or subtract a whole number and adjust, e.g. $4.3-2.9= 4.3-3+0.1$
Decimals, fractions and percentages	<ul style="list-style-type: none"> •Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts 		<ul style="list-style-type: none"> •Consolidate solving calculation problems involving scaling by simple fractions and simple rates
Multiplication and Division	<ul style="list-style-type: none"> •Consolidate knowledge of multiples and factors, including all factor pairs of a number, and common factors of two numbers •Consolidate recall of square numbers and cube numbers and the notation for them •Consolidate recall of prime numbers up to 19 	<ul style="list-style-type: none"> •Identify common factors, common multiples and prime numbers greater than 100 	<ul style="list-style-type: none"> •Multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places