Meridian Angel Mental Calculation Policy 2020

No fun
without
Maths!

National Curriculum Sep 2014 Statutory/non statutory guidance		Mental calculation skills derived from guidance (from National strategy Teaching children to calculate mentally)
Y1	**Numbers and the number system** Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number Count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens Given a number, identify one more and one less	
	Addition and subtraction *Pupils memorise and reason with number bonds to 10 and 20 in several forms (for example, 9+7=9 + 7 = 16; 16 – 7 = 9; 7 = 16 – 9)*	Recall number pairs with a total of 10 and 20, e.g. 3 + 7, or what to add to a single-digit number to make 10 and 20, e.g. 3 + = 10 Recall addition and subtraction facts for all numbers to 20, e.g. 9 + 8, 17 – 9, drawing on knowledge of inverse operations 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 Add near doubles, e.g. 6 + 7 addition and subtraction facts for all numbers up to at least 20, e.g. 9+7=9 + 7 = 16; 16 – 7 = 9; 7 = 16 – 9 Add or subtract a pair of single-digit numbers, including crossing 10, e.g. 5 + 8, 12 – 7 Add any single-digit number to or from a multiple of 10, e.g. 60 + 5 Subtract any single-digit number from a multiple of 10, e.g. 80 – 7 Add or subtract a single digit number to or from a two-digit number, including crossing the tens boundary, e.g. 23 + 5, 57 – 3, then 28 + 5, 52 – 7 Add or subtract a multiple of 10 to or from any two-digit number, e.g. 27 + 60, 72 – 50 Add 9, 19, 29, ... or 11, 21, 31, ... Add near doubles, e.g. 13 + 14, 39 + 40
	Multiplication and division	Recall doubles of all numbers to 10, e.g. double 6 Recall doubles of all numbers to 10 and corresponding halves to 20 Recall odd and even numbers to 20 Count on from and back to zero in ones, twos, fives or tens

<table>
<tr><td>Year 2</td><td colspan="2">Numbers and the number system
Count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward
Recognise the place value of each digit in a two-digit number (tens, ones)
Identify, represent and estimate numbers using different representations, including the number line
Compare and order numbers from 0 up to 100; use <, > and = signs read and write numbers to at least 100 in numerals and in words</td></tr>
<tr><td></td><td>Addition and subtraction

Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100
Add and subtract numbers mentally, including:
a two-digit number and ones
a two-digit number and tens
two two-digit numbers
Adding three one-digit numbers
Show that addition of two numbers can be done in any order(commutative) and subtraction of one number from another cannot
Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.</td><td>

Recall all pairs of multiples of 10 with totals up to 100, e.g. 30 + 70, or 60+ = 100
Recall what must be added to any two-digit number to make the next multiple of 10, e.g. 52 + = 60
Recall addition doubles for all numbers to 20, e.g. 17 + 17 and multiples of 10 to 50, e.g. 40 + 40
Count in fractions up to 10, starting from any number using the ½ and 2/4 equivalence on the number line (1 1/2 , 1 2/4)
Add and subtract groups of small numbers, e.g. 5 – 3 + 2
Add or subtract a two-digit number to or from a multiple of 10, e.g. 50 + 38, 90 – 27
Add and subtract two-digit numbers e.g. 34 + 65, 68 – 35
Add near doubles, e.g. 18 + 16, 60 + 70
Recall sums and differences of multiples of 10, e.g. 50 + 80, 120 – 90
Recall pairs of two-digit numbers with a total of 100, e.g. 32 + 68, or 32 + = 100
Recall addition doubles for multiples of 10 to 100, e.g. 90 + 90</td></tr>
<tr><td></td><td>Multiplication and division

Recall multiplication facts for the 2, 5 and 10 times-tables, and corresponding division facts

Solve problems involving multiplication and division using mental methods</td><td>
Recall doubles of all numbers to 20 e.g. double 13, and corresponding halves
Recall doubles of multiples of 10 to 50, e.g. double 40, and corresponding halves
Recall odd and even numbers to 100
Recall doubles of numbers 1 to 100, e.g. double 58, corresponding halves
Recall double any multiple of 5 up to 100, e.g. double 35
Halve any multiple of 10 up to 200, e.g. halve 170
Find unit fractions of numbers and quantities involving halves, thirds, quarters, fifths and tenths</td></tr>
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<table>
<tr><td>Year 3</td><td colspan="2">Numbers and the number system
Count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number
Recognise the place value of each digit in a three-digit number (hundreds, tens, ones)
Compare and order numbers up to 1000
Identify, represent and estimate numbers using different representations
Read and write numbers up to 1000 in numerals and in words</td></tr>
<tr><td></td><td>Addition and subtraction

Add and subtract numbers mentally, including:
a three-digit number and ones
a three-digit number and tens
a three-digit number and hundreds

For mental calculations with two-digit numbers, the answer could exceed 100</td><td>Recall sums and differences of pairs of multiples of 10, 100 or 1000 e.g. 50 + 80, 120 – 90
Recall addition doubles of numbers 1 to 100, e.g. 38 + 38, and the corresponding halves
Add or subtract any pair of two-digit numbers, including crossing the tens and 100 boundary, e.g. 47 + 58, 91 – 35, 32 + = 100
Add or subtract a near multiple of 10, e.g. 56 + 29, 86 – 38
Add near doubles of two-digit numbers, e.g. 38 + 37
Add or subtract two-digit or three-digit multiples of 10, e.g. 120 – 40, 140 + 150, 370– 180
Recall addition doubles for multiples of 10 to 100, e.g. 90 + 90</td></tr>
<tr><td></td><td>Multiplication and division

Recall multiplication facts for the 3, 4, and 8 times-tables, and corresponding division facts
Recall multiplication tables including two-digit numbers times one-digit numbers, using mental methods

Count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10 compare and order unit fractions, and fractions with the same denominators</td><td>Recall doubles of numbers 1 to 100, e.g. double 58, and corresponding halves
Multiply one-digit or two-digit numbers by 10 or 100, e.g. 7 × 100, 46 × 10, 54 x 100
Double any two-digit number, e.g. double 39
Double any multiple of 10 or 100, e.g. double 340, double 800, and halve the corresponding multiples of 10 and 100
Halve any even number to 200
Find unit fractions and simple non-unit fractions of numbers and quantities, e.g. 3/8 of 24
Multiply and divide two-digit numbers by 4 or 8, e.g. 26 × 4, 96 ÷ 8</td></tr>
<tr><td>Year 4</td><td colspan="2">Numbers and the number system
Count in multiples of 6, 7, 9, 25 and 1000
Find 1000 more or less than a given number
Count backwards through zero to include negative numbers
Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones)</td></tr>
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	Order and compare numbers beyond 1000 Identify, represent and estimate numbers using different representations Round any number to the nearest 10, 100 or 1000 Round decimals with one decimal place to the nearest whole number	
	Addition and subtraction *Pupils continue to practise mental methods with increasingly large numbers to aid fluency to at least 1000* Count backwards through zero to include negative numbers Count up and down in hundredths; recognise that hundredths arise when dividing an object by 100 and dividing tenths by ten.	Add or subtract a pair of two-digit numbers or three-digit multiples of 10, e.g. 38 + 86, 620 – 380, 350+ 360 Add or subtract a near multiple of 10 or 100 to any two-digit or three-digit number, e.g. 235 + 198 Find the difference between near multiples of 100, e.g. 607 – 588, or of 1000, e.g. 6070 – 4087 sums and differences of decimals, e.g. 6.5 + 2.7, 7.8 – 1.3 Doubles and halves of decimals, e.g. half of 5.6, double 3.4 what must be added to any four-digit number to make the next multiple of 1000, e.g. 4087 + ⬛ = 5000 What must be added to a decimal with units and tenths to make the next whole number, e.g. 7.2 + ⬛ = 8
	Multiplication and division Multiplication facts to 12 × 12 and the corresponding division facts Count in multiples of 6, 7, 9, 25 and 1000 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 write decimal equivalents of any number of tenths or hundredths Recognise and write decimal equivalents to ¼, ½, ¾ *Pupils continue to practise recalling and using multiplication tables and related division facts to aid fluency.* *Pupils practise mental methods and extend this to three-digit numbers to derive facts, (for example 600 ÷ 3 = 200 can be derived from 2 x 3 = 6).* Recognise and use factor pairs and commutativity in mental calculations	Squares to 10 × 10 Division facts corresponding to tables up to 10 × 10, and the related unit fractions, e.g. 7 × 9 = 63 so one-ninth of 63 is 7 and one-seventh of 63 is 9 Percentage equivalents of one-half, one-quarter, three-quarters, tenths and hundredths factor pairs to 100 *Multiply and divide numbers to 1000 by 10 and then 100(whole-number answers), e.g. 325 × 10, 42 × 100, 120 ÷ 10, 600 ÷ 100, 850 ÷ 10* *Multiply a multiple of 10 to 100 by a single-digit number, e.g. 40 × 3* *Multiply numbers to 20 by a single-digit, e.g. 17 × 3* *Identify the remainder when dividing by 2, 5 or 10* *Give the factor pair associated with a multiplication fact, e.g. identify that if 2 x 3 = 6 then 6 has the factor pair 2 and 3 multiply two-digit numbers by 5 or 20, e.g. 320 × 5, 14 × 20* *Multiply by 25 or 50, e.g. 48 × 25, 32 × 50* *Double three-digit multiples of 10 to 500, e.g. 380 × 2, and find the corresponding halves, e.g. 760 ÷ 2* *Find the remainder after dividing a two-digit number by a single-digit number, e.g. 27 ÷ 4 = 6 R 3* *Multiply and divide whole numbers and decimals by 10, 100 or 1000, e.g. 4.3 × 10,0.75 × 100, 25 ÷ 10, 673 ÷ 100, 74 ÷ 100*

		Multiply pairs of multiples of 10, e.g. 60 × 30, and a multiple of 100 by a single digit number, e.g. 900 × 8 *Divide a multiple of 10 by a single-digit number (whole number answers) e.g. 80 ÷ 4, 270 ÷ 3* *Find fractions of whole numbers or quantities, e.g. 2* *3 of 27, 4 5 of 70 kg* *Find 50%, 25% or 10% of whole numbers or quantities, e.g. 25% of 20 kg, 10% of £80* *Find factor pairs for numbers to 100, e.g. 30 has the factor pairs 1 × 30, 2 × 15, 3 × 10 and 5 × 6*
Year 5	**Numbers and the number system** Read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit Count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000 Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero Round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000	
	Addition and subtraction Add and subtract numbers mentally with increasingly large numbers with more than 4 digits *They practise mental calculations with increasingly large numbers to aid fluency (for example, 12 462 – 2300 = 10 162).* *They mentally add and subtract tenths, and one-digit whole numbers and tenths.* *They practise adding and subtracting decimals, including a mix of whole numbers and decimals, decimals with different numbers of decimal places, and complements of 1 (for example, 0.83 + 0.17 = 1).*	What must be added to any four-digit number to make the next multiple of 1000, e.g. 4087 + ⛃= 5000 Addition and subtraction facts for multiples of 10 to 1000 and decimal numbers with one decimal place, e.g. 650 + ⛃ = 930, ⛃ – 1.4 = 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 Add or subtract pairs of decimals with units, tenths or hundredths, e.g. 0.7 + 3.38 Find doubles of decimals each with units and tenths, e.g. 1.6 + 1.6 Add near doubles of decimals, e.g. 2.5 + 2.6 Add or subtract a decimal with units and tenths, that is nearly a whole number, e.g. 4.3 + 2.9, 6.5 – 3.8
	Multiplication and division Multiply and divide numbers mentally drawing upon known facts of multiplication to 12× 12 table *They apply all the multiplication tables and related division facts frequently* *Pupils use multiplication and division as inverse*	Squares, cubes and primes to 12 × 12 Squares of the corresponding multiples of 10 Prime numbers less than 100 Equivalent fractions, decimals and percentages for hundredths, e.g. 35% is equivalent to 0.35 or 35/100 Division facts corresponding to tables up to 10 × 10, and the related unit fractions, e.g. 7 × 9 = 63 so one-ninth of 63 is 7 and one-seventh of 63 is 9 Multiply pairs of two-digit and single-digit numbers, e.g. 28 × 3 Divide a two-digit number by a single-digit number, e.g. 68 ÷ 4 Divide by 25 or 50, e.g. 480 ÷ 25, 3200 ÷ 50

	Squares, cubes and primes of the corresponding multiples of 12 Percentage equivalents of one-half, one-quarter, three-quarters, tenths and hundredths	Double decimals with units and tenths, e.g. double 7.6, and find the corresponding halves, e.g. half of 15.2 Multiply pairs of multiples of 10 and 100, e.g. 50 × 30, 600 × 20 Divide multiples of 100 by a multiple of 10 or 100 (whole number answers), e.g. 600 ÷ 20, 800 ÷ 400, 2100 ÷ 300 Multiply and divide two-digit decimals such as 0.8 × 7, 4.8 ÷ 6 Find 10% or multiples of 10%, of whole numbers and quantities, e.g. 30% of 50 ml, 40% of £30, 70% of 200 g Simplify fractions by cancelling Scale up and down using known facts, e.g. given that three oranges cost 24p, find the cost of four oranges Identify numbers with odd and even numbers of factors and no factor pairs other than 1 and themselves
6	**Numbers and the number system** Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit Round any whole number to a required degree of accuracy Use negative numbers in context, and calculate intervals across zero	

	Addition and subtraction Multiplication and division Perform mental calculations including mixed operations and large numbers *Pupils continue to use all the multiplication tables to calculate mathematical statements in order to maintain their fluency.* Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts *Pupils can explore and make conjectures about converting a simple fraction to a decimal fraction (for example, 3 ÷ 8 = 0.375).* *Pupils multiply decimals by whole numbers, starting with the simplest cases, such as 0.4 × 2 = 0.8, and in practical contexts, such as measures and money.* *They recognise division calculations as the inverse of multiplication.*	Use the commutative, associative and distribute laws. -Commutative law e.g. 4 x 7 x 5 = 4 x 5 x 7 = 20 x 7 = 140 -Associative law e.g. 15 x 33 = (5 x 3) x 33 or 5 x (3 x 33) = 5 x 99 = 495 -Distributive law e.g. 3.7 x 99 = 3.7 x (100 – 1) = (3.7 x 100) – (3.7 x 1) = 370 – 3.7 = 366.3 A quotient (the result obtained after division) can be expressed as a fraction or as a decimal, e.g. 90 ÷ 13 = 6 $\frac{12}{13}$ 90 ÷ 13 = 6.92 (rounded to two decimal places). Understand that multiplication and division are inverse operations, and use this to check result, e.g. 6783 ÷ 19 = 357 appears to be about right because 350 x 20 = 7000. Relate division to fractions. Understand that: $\frac{1}{4}$ of 3.6 is equivalent to 3.6 ÷ 4; 7 ÷ 8 is equivalent to $\frac{7}{8}$; $\frac{50}{3}$ is equivalent to 50 ÷ 3. Know that the order of operations is: bracket, powers or indices, multiplication (including 'of') and division, addition and subtraction. Calculate with mixed operations, including with a calculator. E.g. 32 + 13 x 5 = 97; (32 + 13) x 5 = 225; $(3^2 + 4^2)^2 = 625$; $(5^2 - 7)/(2^2 - 1) = 6$ Know with rapid recall addition and subtraction facts to 20. Derive quickly doubles of two-digit numbers including decimals, e.g. 23 x 2, 3.8 x 2, 0.76 x 2 Doubles of multiples of 10 to 1000, e.g. 670 x 2, 830 x 2 Doubles of multiples of 100 to 10 000, e.g. 1700 x 2, 6500 x 2 And all the corresponding halves Derive quickly whole-number complements in 100, e.g. 100 = 63 + 37 Decimal complements in 1 (one or two decimal places), e.g. 1 = 0.8 + 0.2, 1 = 0.41 + 0.59 Recall rapidly or derive quickly simple decimal/fraction/percentage equivalents, such as: $\frac{1}{8}$ = 0.125 or 12 $\frac{1}{2}$ %, 0.23 is equivalent to 23%, 1 $\frac{3}{4}$ = 1.75 or 175%, 57% is equivalent to 0.57 or $\frac{57}{100}$ Simple addition facts for fractions, such as $\frac{1}{4} + \frac{1}{4} = \frac{1}{2}$; $\frac{1}{4} + \frac{1}{2} = \frac{3}{4}$ Count forwards and backwards from any number. E.g. Count on in 0.1s from 4.5; Count back from 4.05 in 0.01s; Count on from and back to zero in steps of $\frac{3}{4}$ Add mentally several small positive or negative numbers. E.g. 4 + 8 + 12 + 6 + 13; 5 + (-4) + 8 + (-10) + (-7) Extend to calculating a mean using an assumed mean. E.g. Find the mean of 18.7, 18.4, 19.1, 18.3 and 19.5. Use 19.0 as the assumed mean. The differences are -0.3, -0.6, 0.1, -0.7 and 0.5, giving a total difference of -1.0. The actual mean is 19.0 – (1.0 ÷ 5) = 18.8. Continue to add and subtract any pair of two-digit whole numbers, such as 76 +58, 91 – 47.

		Extend to adding and subtracting a two-digit whole number to or from a three-digit whole numb er; adding and subtracting decimals, e.g. 8.6 ± 5.7, 0.76 ± 0.58. Use near doubles. E.g 8.5 + 8.2 = 16.7 (double 8.2 plus 0.3); 427 + 366 = 793 (double 400 plus 27 minus 34). Use the relationship between addition and subtraction. E.g. recognise that knowing one of: 2.4 + 5.8 = 8.2; 5.8 + 2.4 = 8.2; 8.2 – 5.8 = 2.4; 8.2 – 2.4 = 5.8, means that you also know the other three. Use factors. E.g. 4.5 x 1.8 4.5 x 6 = 27 27 x 3 = 81 3.2 x 30 3.2 x 10 = 32 32 x 3 = 96 22 0.02 22 x 0.01 = 0.22 0.22 x 2 = 0.44 420 ÷ 15 420 ÷ 5 = 84 84 ÷ 3 = 28 Use known facts such as $\frac{1}{5}$ = 0.2 to calculate mentally $\frac{3}{5}$ = 3 x 0.2 = 0.6. Convert between improper fractions and mixed numbers. E.g. Convert 7 $\frac{1}{3}$ into an improper fraction; Convert $\frac{36}{5}$ into a mixed number. Find simple equivalent fractions. E.g. State three fractions equivalent to $\frac{3}{5}$, such as: $\frac{6}{10}$, $\frac{30}{50}$, $\frac{24}{40}$ Fill in the boxes: $\frac{3}{4}$ = $\frac{}{8}$ = $\frac{}{12}$ = $\frac{}{16}$ = $\frac{}{20}$; $\frac{7}{}$ = $\frac{21}{30}$ Convert between fractions, decimals and percentages. E.g. Convert 23% into a decimal (Know that 23% is equivalent to $\frac{23}{100}$ or 0.23.); Convert $\frac{3}{5}$ into a percentage (Know that $\frac{3}{5}$ = $\frac{6}{10}$ or $\frac{60}{100}$, so it is equivalent to 60%.); Express 55% as a fraction in its lowest terms (Know that 55% is equivalent to $\frac{55}{100}$, and cancel this to $\frac{11}{20}$.)