St Anne's Mental Calculation Policy

Date approved:	19th February, 2024
Date of review:	Summer Term 2025

Rationale:

This policy lays out the expectations for mental calculations and has been created to support the teaching of a mastery approach to mathematics in line with the National Curriculum and the White Rose scheme, which forms the framework of our curriculum through its long- and medium-term planning outline and small steps. This is underpinned by the use of models and images that support conceptual understanding and this policy promotes a range of representations to be used across EYFS, KS1 and KS2. For more information on these representations with examples, please refer to our written calculation policies.

A Mastery Approach:

A mastery approach to learning involves the following five "big ideas" of effective maths teaching:

Coherence -	a coherent learning progression offering deep and connected understanding
Representation and Structure	concrete, pictorial and abstract representations are carefully structured to help pupils "see the maths"
Mathematical Thinking -	looking for patterns and relationships, making connections, conjecturing, reasoning and generalising, communicating ideas using precise vocabulary
Fluency - - -	efficient, accurate recall of key number facts and procedures, allowing pupils to move between different contexts and representations, choosing strategies
Variation - - -	conceptual variation presents different representations of key features, while procedural variation presents different ways of proceeding through the learning journey (via scaffolding and support, etc)

Concrete – Pictorial – Abstract:

Mathematical understanding is developed through use of representations that are initially concrete (e.g. counters, multilink cubes, dienes, etc), and then pictorial (e.g. part-whole models, place value columns with images of counters in them, etc) to then facilitate abstract working (e.g. formal written methods).

This policy is a guide through an appropriate progression of representations. If at any point a pupil is struggling with the abstract, they should revert to familiar pictorial and/or concrete materials/representations as appropriate. As children move through the different stages, representations should be modelled alongside each other to ensure a secure understanding is maintained. Children should only move onto the abstract method when they have a secure understanding of the concept through an appropriate concrete and pictorial representation. This policy should be used in conjunction with the St Anne's Mathematics policy, our Written Calculation Policies and the White Rose calculation policy, as well as our Key Instant Recall Facts documents, which we share with our families to supplement the learning children receive in school. Teachers are also encouraged to refer to the NCETM Ready-To-Progress Criteria resources in ascertaining when children are ready to move on to new learning.

Vocabulary:

Children will continually recap vocabulary learned in previous years to ensure that their understanding and usage of the terminology is fully developed, broad and specific in application. Vocabulary from previous years is included in each year group's columns in black, while new vocabulary that may not have been previously encountered is in green. Teachers are encouraged to check this list of vocabulary at the beginning and end of a relevant unit to ensure that they are modelling the full breadth and depth of vocabulary to the children, and that the children are using it in their verbal and written responses accurately and confidently.

Please see appendix 4 of the written calculation policies for notes on precise vocabulary, and for a comprehensive glossary, please see the separate document "NCETM Maths Glossary KS1-KS3" which is saved in PDF format with our calculation policies in the shared area.

Contents:

Mental Calculations in Reception

Place Value	Addition	Subtraction	Multiplication	Division
Count objects, actions and sounds. Subitise **Vocabulary:** subitise count number (1, 2, 3, etc) order compare bigger larger biggest smaller smallest in the middle forwards backwards first, second, etc	Link the number symbol (numeral) with its cardinal number value. Find one more than a given number. Recall number bonds to 10. Double numbers. **Vocabulary:** add, more, altogether, total, double, count up/on, and, make, part, whole	Take away a single number. Find one less than a given number. Recognise some relationships between numbers and patterns. Count backwards in ones. **Vocabulary:** take (away), leave, how many are left/left over? how many have gone? one less, two less, ten less, how many fewer is… than…? difference between, is the same as	Jump along a number line in steps of … Look at patterns and counting. Grouping objects, counting groups of the same size. Double numbers. Talk about odds and evens. **Vocabulary:** odd, even, double, groups of, ones, twos, tens, count in …	Share objects into equal groups. Recognise patterns. **Vocabulary:** groups of, grouping, sharing, share, shared, ___ each, equal, equally, same size, same amount

Mental Calculations in Year 1

Key Instant Recall Facts	Place Value	Addition	Subtraction	Multiplication	Division
Autumn 1: Number bonds to 5 **Autumn 2:** Number bonds to 10 **Spring 1:** Recognise numbers to 50 **Spring 2:** Know halves and doubles to 10 **Summer 1:** Know number bonds for each number up to 10 **Summer 2:** Tell the time to the nearest half an hour	Count to and across 100, forward and backwards, beginning with 0 or 1, or from any given number Count in multiples of twos, fives and tens Count and read numbers to 100 in numerals Read numbers from 1 to 20 in numerals and words Given a number, identify one more and one less Find 10 more and 10 less of numbers to 100 Order numbers to 100 **Vocabulary:** subitise, count, number (1, 2, 3, etc), order, compare bigger, larger biggest, smaller smallest, in the middle, forwards, backwards, first, second, etc **multiples, value, numeral, more, greater, less,**	Add one-digit and two-digit numbers to 20, including zero **Vocabulary:** add, more, altogether, total, double, count up/on, and, make, part, whole, **plus, equals, equal to, number line, number bond**	Subtract one-digit and two-digit numbers to 20, including zero **Vocabulary:** take (away), leave, how many are left/left over? how many have gone? one less, two less, ten less, how many fewer is… than…? difference between, is the same as, **minus, subtract, how much less is…? half, halve, equals,**	**Vocabulary:** odd, even, double, groups of, ones, twos, **threes, fives,** tens, count in …, **(forwards from/ backwards from), how many times, lots of, groups of, once, twice, ___ times, multiple/s of ___, times, multiply, multiplied by, repeated addition, array, row, column**	Find ½ and ¼ of a set of objects **Vocabulary:** groups of, grouping, sharing, share, shared, ___ each, **in pairs, in ___s,** equal, equally, same size, same amount, **division, divide, divided by, dividing, divided into**
Rapid Recall Represent and use number bonds and related subtraction facts within 20 *Doubles of numbers to 10* *Near doubles of numbers to 10* *Recall number bonds 1-10* *Recognise odd and even numbers to 20* *Partition and combine a two digit number - tens and ones.* *Know pairs of multiples of 10 up to 100 (e.g. 40+60, 70+30 etc.)* *Find half of even numbers to 20 using knowledge of doubling to help.*					

	inequality sign, equal, same, part-whole model, number line, number track, bar model, 100-square, place value, column,				

Mental Calculations in Year 2

Key Instant Recall Facts	Place Value	Addition	Subtraction	Multiplication	Division
Autumn 1: Number bonds to 20 **Autumn 2:** Doubles and halves for numbers to 20 **Spring 1:** 2x table (x and ÷) **Spring 2:** 10x table (x and ÷) **Summer 1:** 5x table (x and ÷) **Summer 2:** Tell the time to the nearest 5 minutes	Count in steps of 2, 3, and 5 from 0 Count in tens from any number, forward or backward Read numbers to at least 100 in numerals and in words Compare and order numbers from 0 up to 100; use <, > and = signs Recognise the place value of each digit in a two-digit number (tens, ones) Count in halves eg ½,1, 1 1/2 , 2, 2 ½ … Round to nearest 10 **Vocabulary:** subitise, count, number (1, 2, 3, etc), order, compare bigger, larger biggest, smaller smallest, in the middle, forwards, backwards, first, second, etc multiples, value, numeral, more, greater, less, inequality sign, equal, same, part-whole model, number line,	Add numbers mentally, including: - a two-digit number and ones eg. 27 + 6 - a two-digit number and tens eg 36 +20 - two two-digit numbers - adding three one-digit numbers - Add near multiple of 10 eg 9,19.. 11, 21. **Vocabulary:** add, more, altogether, total, double, count up/on, and, make, part, whole, plus, equals, equal to, number line, **digit, tens, ones, greater than, less than, operation, partition, recombine, represents, inverse**	Subtract numbers mentally, including: - a two-digit number and ones eg. 27- 6 Subtract a two-digit number and tens eg 36-20 Subtract two two-digit numbers (crossing 10s boundaries) **Vocabulary:** **subtract, subtraction,** take (away), leave, how many are left/left over? how many have gone? one less, two less, ten less, **one hundred less,** how many or fewer is… than…? difference between, is the same as, minus, subtract, how much less is…? half, halve, equals, **tens boundary, regroup, exchange, inverse**	Recall and use multiplication facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers Show that multiplication of two numbers can be done in any order (commutative) Multiply single digit by x10 and use zero as a place holder **Vocabulary:** odd, even, double, groups of, ones, twos, threes, fives, tens, count in …, (forwards from/backwards from), how many times, lots of, groups of, once, twice, ___ times, multiple/s of ___, times, multiply, multiplied by, repeated addition, array, row, column, **commutative law,**	Recall and use division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers Divide any multiple of 10 by 10 **Vocabulary:** groups of, grouping, sharing, share, shared, ___ each, in pairs, in ___s, equal, equally, same size, same amount, **division, divide, divided by, dividing, divided into, left (over), array**
Rapid Recall Recall and use addition and subtraction facts to 20 fluently Derive and use related facts up to 100 eg-Pairs of multiples of 10 eg. 30 + 70= 100 60 + ? = 100 Derive all bonds to 100. Doubles of all numbers to 20 Doubles of multiples of 10 and 5 eg 40+40 or 35+35 Half of even numbers to 20 Half of multiples of 10 eg half of 60= 30, 90=45 Odd and even numbers to 100 To know what to add to a number to reach the next multiple of 10 (e.g. 32+__=40)					

	number track, bar model, 100-square, place value, column, **digit round rounding**				

Mental Calculations in Year 3

Key Instant Recall Facts	Place Value	Addition	Subtraction	Multiplication	Division
Autumn 1: Number bonds for each number to 20 **Autumn 2:** 3x table (x and ÷) **Spring 1:** 4x table (x and ÷) **Spring 2:** 8x table (x and ÷) **Summer 1:** Recall facts about durations of time **Summer 2:** Tell the time to the nearest minute **Rapid Recall** Recall of all bonds to 100 (multiples of 5 and 10) Double of all numbers to at least 20 and related halves. Eg half of 5 is 2.5	Count from 0 in multiples of 2, 3, 4, 5, 8, 10, 50 and 100 Read and write numbers to 1000 in numerals and in words Compare and order numbers up to 1000 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) Round to the nearest 10, 100 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 **Vocabulary:** subitise, count, number (1, 2, 3, etc), order, compare bigger, larger biggest, smaller smallest, in the middle, forwards, backwards, first, second, etc	Add numbers mentally, including: - a three-digit number and ones eg 327 + 8 - a three-digit number and tens 428 + 40 - a three-digit number and hundreds 368 +200 **Vocabulary:** add, more, altogether, total, double, count up/on, and, make, part, whole, plus, equals, equal to, number line, digit, tens, ones, greater than, less than, operation, partition, recombine, represents, inverse, **hundreds, increase, expanded, digits, augend, addend, sum**	Subtract numbers mentally, including a 3-digit number and ones, e.g. 327 - 8 Subtract a 3-digit number and tens 428 - 40 Subtract a 3-digit number and hundreds 368 - 200 **Vocabulary:** subtract, subtraction, take (away), leave, how many are left/left over? how many have gone? one less, two less, ten less, one hundred less, how many or fewer is… than…? difference between, is the same as, minus, subtract, how much less is…? half, halve, equals, tens boundary, **hundreds boundary,** regroup, exchange, inverse, **minuend, subtrahend, decrease, inverse**	Recall and use multiplication facts for the 2, 3, 4, 5, 8 and 10 multiplication tables Multiple 2 digit numbers numbers by x10 and x100 using zero as a place holder Multiplying a single digit number by a multiple of 10 eg 7 x 30; **Vocabulary:** odd, even, double, groups of, ones, twos, threes, fives, tens, count in …, (forwards from/backwards from), how many times, lots of, groups of, once, twice, ___ times, multiple/s of ___, times, multiply, multiplied by, repeated addition, array, row, column, commutative law, **multiplicand, multiplier, product, scale up, regroup, exchange,**	Recall and use multiplication and division facts for the 2, 3, 4, 5, 8 and 10 and 10 multiplication tables Divide any multiple of 10 by 10 eg 30÷ 10 Divide any multiple of 100 by 10 or 100 eg 2400÷100 Give $\frac{1}{2}$, $\frac{1}{4}$, 1/5, 1/3 of any 2 digit number **Vocabulary:** groups of, grouping, sharing, share, shared, ___ each, in pairs, in ___s, equal, equally, same size, same amount, division, divide, divided by, dividing, divided into, left (over), array, **guess, estimate, remainder, approximate, approximately**

	multiples, value, numeral, more, greater, less, inequality sign, equal, same, part-whole model, number line, number track, bar model, 100-square, place value, column, digit, round, rounding. **hundreds, partition,**				

Mental Calculations in Year 4

Key Instant Recall Facts	Place Value	Addition	Subtraction	Multiplication	Division
Autumn 1: Number bonds of 100 **Autumn 2:** 6x and 9x tables (x and ÷) **Spring 1:** 7x and 11x tables (x and ÷) **Spring 2:** All times tables up to 12x12 (x and ÷) **Summer 1:** Multiply and divide a single digit by 10 and 100 **Summer 2:** Recognise simple equivalent fractions **Rapid Recall** Recall of all bonds to 100 (multiples of 5 and 10) Double of all numbers to at least 20 and related halves. Eg half of 5 is 2.5	Count in multiples of 6, 7, 9, 25 and 1000 Order and compare numbers beyond 1000 Find 1000 more or less than a given number Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens and ones) Round any number to the nearest 10, 100 or 1000 Count backwards through zero to include negative numbers Count up and down in hundredths; recognise that hundredths arise when dividing an object by a hundred and dividing tenths by ten Recognise and write decimal equivalents to $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$ Recognise and write decimal equivalents of any number of tenths or hundredths	Add and subtract fractions with the same denominator *Know pairs of fractions that total 1.* *Work out what must be added to any three digit number to make the next multiple of 100 (e.g. 521 + __ = 600)* **Vocabulary:** add, more, altogether, total, double, count up/on, and, make, part, whole, plus, equals, equal to, number line, digit, tens, ones, greater than, less than, operation, partition, recombine, represents, inverse, hundreds, increase, expanded, digits, augend, addend, sum, **thousands, decimal, decimal place, decimal point, tenths**	Estimate and use inverse operations to check answers to a calculation **Vocabulary:** subtract, subtraction, take (away), leave, how many are left/left over? how many have gone? one less, two less, ten less, one hundred less, how many or fewer is… than…? difference between, is the same as, minus, subtract, how much less is…? half, halve, equals, tens boundary, hundreds boundary, **ones boundary, tenths boundary (etc),** regroup, exchange, inverse, minuend, subtrahend, decrease, inverse	Recall multiplication facts for multiplication tables up to 12 × 12 Use place value, known and derived facts to multiply mentally, including: multiplying by 0 and 1; Multiply multiples of 10 by multiples of 10 eg 60 x 20 Multiplying together three numbers eg 3 x 4 x 5 Recognise and use factor pairs and commutativity in mental calculations **Vocabulary:** odd, even, double, groups of, ones, twos, threes, fives, tens, count in …, (forwards from/backwards from), how many times, lots of, groups of, once, twice, ___ times, multiple/s of __, times, multiply, multiplied by,	Recall division facts for multiplication tables up to 12 × 12 Estimate and use inverse operations to check answers to a calculation Use place value, known and derived facts to divide mentally, including: dividing by 1; Find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths **Vocabulary:** groups of, grouping, sharing, share, shared, ___ each, in pairs, in ___s, equal, equally, same size, same amount, division, divide, divided by, dividing, divided into, left (over), array, guess, estimate, remainder,

	Round decimals with one decimal place to the nearest whole number Compare numbers with the same number of decimal places up to two decimal places **Vocabulary:** subitise, count, number (1, 2, 3, etc), order, compare bigger, larger biggest, smaller smallest, in the middle, forwards, backwards, first, second, etc, multiples, value, numeral, more, greater, less, inequality sign, equal, same, part-whole model, number line, number track, bar model, 100-square, place value, column, digit, round, rounding, hundreds, partition, **thousands, positive, negative, hundredths, decimal, decimal point, decimal place,**			repeated addition, array, row, column, commutative law, multiplicand, multiplier, product, scale up, regroup, exchange, **multiplication facts, division facts, inverse, derive**	approximate, approximately, **commutative (law), commutativity, regroup, exchange**

Mental Calculations in Year 5

Key Instant Recall Facts	Place Value	Addition	Subtraction	Multiplication	Division
Autumn 1: Find factor pairs of a number **Autumn 2:** Recognise prime numbers up to 20 **Spring 1:** Recognise equivalent fractions and decimals **Spring 2:** Decimal number bonds to 1 and 10 **Summer 1:** Metric conversion **Summer 2:** Square numbers to 12 and their square roots **Rapid Recall** Identify multiples and factors, including finding all factor pairs of a number and common factors of two numbers Establish whether a number up to 100 is prime and recall prime numbers up to 19 Recall square numbers and cube numbers to 12 *Double and halve numbers up to 1000* *To know number bonds to 1000 in multiples of 5 or 10.*	Count forwards or backwards in steps of powers of 10 for any given number up to 1000000 Read, write, order and compare numbers to at least 1 000 000 Determine the value of each digit in numbers up to 1 000 000 Round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000 Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero Read and write decimal numbers as fractions [e.g.: 0.71 = 71/100] Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents Round decimals with two decimal places to the	Add numbers mentally with increasingly large numbers Add fractions with the same denominator and denominators that are multiples of the same number *Know what to add to a decimal with units and tenths to make the next whole number (e.g. 7.2 + __ = 8)* *Know what to add to a four digit number to make the next multiple of 1000 (e.g. 4087 + ____ = 5000)* *Know sums and differences of decimals (e.g. 6.5 + 2.7)* **Vocabulary:** add, more, altogether, total, double, count up/on, and, make, part, whole, plus, equals, equal to, number line, digit, tens, ones, greater than, less than, operation, partition, recombine, represents,	Subtract numbers mentally with increasingly large numbers Subtract fractions with the same denominator and denominators that are multiples of the same number *Know sums and differences of decimals (e.g. 6.5 + 2.7)* **Vocabulary:** subtract, subtraction, take (away), leave, how many are left/left over? how many have gone? one less, two less, ten less, one hundred less, how many or fewer is… than…? difference between, is the same as, minus, subtract, how much less is…? half, halve, equals, tens boundary, hundreds boundary, **thousands boundary (etc),** ones boundary,	Multiply numbers mentally drawing upon known facts Multiply whole numbers and those involving decimals by 10, 100 and 1000 **Vocabulary:** odd, even, double, groups of, ones, twos, threes, fives, tens, count in …, (forwards from/backwards from), how many times, lots of, groups of, once, twice, ___ times, multiple/s of __, times, multiply, multiplied by, repeated addition, array, row, column, commutative law, multiplicand, multiplier, product, scale up, regroup, exchange, multiplication facts, division facts, inverse, derive, **most efficient method**	Divide numbers mentally drawing upon known facts Divide whole numbers and those involving decimals by 10, 100 and 1000 **Vocabulary:** groups of, grouping, sharing, share, shared, ___ each, in pairs, in ___s, equal, equally, same size, same amount, division, divide, divided by, dividing, divided into, left (over), array, guess, estimate, remainder, approximate, approximately, commutative (law), commutativity, regroup, exchange, **factor, multiple, square, cube, scale (by), scaling (by), simple fraction, decimal remainder, simple rate**

	nearest whole number and to one decimal place Read, write, order and compare numbers with up to three decimal places Use mental rounding to estimate and check answers **Vocabulary:** subitise, count, number (1, 2, 3, etc), order, compare bigger, larger biggest, smaller smallest, in the middle, forwards, backwards, first, second, etc, multiples, value, numeral, more, greater, less, inequality sign, equal, same, part-whole model, number line, number track, bar model, 100-square, place value, column, digit, round, rounding, hundreds, partition, thousands, positive, negative, hundredths, decimal, decimal point, decimal place, **millions,**	inverse, hundreds, increase, expanded, digits, augend, addend, sum, thousands, decimal, decimal place, decimal point, tenths	tenths boundary (etc), regroup, exchange, inverse, minuend, subtrahend, decrease, inverse, **negative**		

Mental Calculations in Year 6

Key Instant Recall Facts	Place Value	Addition	Subtraction	Multiplication	Division
Autumn 1: Identify common factors of a pair of numbers **Autumn 2:** Convert between fractions, decimals and percentages **Spring 1:** Find a fraction of an amount **Spring 2:** Find a percentage of an amount **Summer 1:** *Individualised consolidation of skills to prepare for KS3* **Summer 2:** *Individualised consolidation of skills to prepare for KS3*	Read, write, order and compare numbers up to 10 000 000 Determine the value of each digit in numbers up to 10 000 000 Round any whole number to a required degree of accuracy Use negative numbers in context, and calculate intervals across zero Compare and order fractions, including fractions >1 Associate a fraction with division to calculate decimal fraction equivalents (e.g.: 0.375) for a simple fraction [e.g.: 3/8] Identify the value of each digit to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places **Vocabulary:**	Perform mental calculations, including with mixed operations and large numbers Add fractions with different denominators and mixed numbers, using the concept of equivalent fractions **Vocabulary:** add, more, altogether, total, double, count up/on, and, make, part, whole, plus, equals, equal to, number line, digit, tens, ones, greater than, less than, operation, partition, recombine, represents, inverse, hundreds, increase, expanded, digits, augend, addend, sum, thousands, decimal, decimal place, decimal point, tenths	Perform mental calculations, including with mixed operations and large numbers Subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions **Vocabulary:** subtract, subtraction, take (away), leave, how many are left/left over? how many have gone? one less, two less, ten less, one hundred less, how many or fewer is… than…? difference between, is the same as, minus, subtract, how much less is…? half, halve, equals, tens boundary, hundreds boundary, thousands boundary (etc), ones boundary, tenths boundary (etc), regroup, exchange, inverse, minuend,	Perform mental calculations, including with mixed operations and large numbers Multiply numbers by 10, 100 and 1000 giving answers up to three decimal places Multiply one-digit numbers with up to two decimal places by whole numbers *Multiply integers by o.5 and 0.25, including mixed numbers.* **Vocabulary:** odd, even, double, groups of, ones, twos, threes, fives, tens, count in …, (forwards from/backwards from), how many times, lots of, groups of, once, twice, ___ times, multiple/s of __, times, multiply, multiplied by, repeated addition, array, row, column, commutative law, multiplicand, multiplier, product, scale	Perform mental calculations, including with mixed operations and large numbers Divide numbers by 10, 100 and 1000 giving answers up to three decimal places Divide proper fractions by whole numbers [e.g.: 1/3 ÷ 2 = 1/6] *Divide integers by 0.5 and 0.25, including mixed numbers.* **Vocabulary:** groups of, grouping, sharing, share, shared, ___ each, in pairs, in ___s, equal, equally, same size, same amount, division, divide, divided by, dividing, divided into, left (over), array, guess, estimate, remainder, approximate, approximately, commutative (law), commutativity, regroup, exchange,
Rapid Recall Identify common factors, common multiples and prime numbers Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts					

	subitise, count, number (1, 2, 3, etc), order, compare bigger, larger biggest, smaller smallest, in the middle, forwards, backwards, first, second, etc, multiples, value, numeral, more, greater, less, inequality sign, equal, same, part-whole model, number line, number track, bar model, 100-square, place value, column, digit, round, rounding, hundreds, partition, thousands, positive, negative, hundredths, decimal, decimal point, decimal place, millions, **degree of accuracy**		subtrahend, decrease, inverse, negative	up, regroup, exchange, multiplication facts, division facts, inverse, derive, most efficient method, **order of operations**	factor, multiple, square, cube, scale (by), scaling (by), simple fraction, decimal remainder, simple rate