Mental Maths at Shenley Primary School

Introduction

As teachers and teaching assistants who support maths learning in the classroom, we have all undoubtedly encountered children who stick doggedly to a method for solving a problem when a much easier method exists. In the most extreme cases, this loyalty to a favoured method prevents the child from achieving an accurate solution. Even if they get the correct answer, it may have taken them a long time and there have been many opportunities to make mistakes that they were lucky to avoid. A simple way to express this is that they choose an inefficient method.

Mental maths is an essential skill for use in real world situations. It can be used when calculating change when using money or to work out how many minutes you will need to wait when using a bus or train timetable. Fluency with mental maths empowers children to feel confident with maths. The focus on mental maths supports our aim of children gaining financial literacy skills.

If asked to calculate 99% of 300, some children will calculate 1% of 300 (dividing 300 by 100) and multiply that answer by 99. There are clearly more opportunities for error in this method than calculating 1% of 300 and subtracting the answer, 3 from 300. Furthermore, children are far more likely to be able to do the latter method in their head without recourse to pencil and paper than the former method, saving them time and building their confidence for trying to solve more complex problems.

Children often stick with inefficient methods because they are unfamiliar with alternative methods. In the lessons that come from this policy pupils will be discreetly exploring how to mentally solve calculations and problems. The explicit teaching of these methods will have occurred during the main maths lesson, so these additional sessions are an opportunity for children to build familiarity with a range of methods. As recommended in 'Coordinating Mathematical Success' (OFSTED 2023) : "[successful] curriculums emphasise secure learning of, rather than encountering, mathematical knowledge."

We pride ourselves on an approach to mathematics that is centred around children having opportunities to 'Build it', 'Draw it', 'Write it', and 'Say it.' This empowers children with a strong conceptual understanding through using concrete manipulatives and opportunities to visualise and draw pictorial representations of problems. This policy and the lessons that will be taught based upon this policy, will serve to compliment and extend this firm foundation.

When using this policy, teachers should consider the needs of their class through their ongoing assessment. The progression that is implicit in the policy gives opportunity to revise learning from previous years and is structured to compliment the main curriculum. However, teachers must use their professional judgement to decide if the children in their class will need more time with a certain area.

Lessons should be short and fun with the intention of reinforcing children's previous learning and helping the learning to stick. The intention is for children to achieve automaticity. However, it is not essential that children have instant recall providing they have efficient methods for rapid recall.

YEAR 1 Blue text = previous learning			
	Counting	**Addition and subtraction**	**Multiplication and division**
Autumn	Revision from Reception Counting in 1s starting from 0, beyond 20. Counting objects, actions and sounds. Counting in 1s backwards from beyond 20. Counting in 2s (from 0- even) forwards	Revision from Reception Adding facts to 5 Subtraction facts from 5. Number pairs within 10. Number pairs to 10.	Revision from Reception Double facts to 5 -double 1 -double 2 -double 3 etc
Spring	Counting to and across 50, forwards and backwards, beginning with 0 or 1 and any given number. Counting in 2s (from 0- even) forwards	Number pairs to 20 Add near doubles up to double 10 e.g. 5 + 6 = Add a multiple of 10 to a single digit number e.g 10 + 7 , 6 + 30	Double facts to 10. Halving numbers to 10 (even numbers)
Summer	Counting to and across 100, forwards and backwards, beginning with 0 or 1 and any given number. Counting in 5s and 10s forwards from 0.	Number pairs to 20. Add near doubles up to double 10 e.g. 5 + 6 = Add a multiple of 10 to a single digit number e.g 10 + 7 , 6 + 30	Double facts to 10. Halving numbers to 20 (even numbers)

YEAR 2 Blue text = previous learning			
	Counting	**Addition and subtraction**	**Multiplication and division**
Autumn	Revision from Year 1 Counting to and across 100, forwards and backwards, from any given number. Count in multiples of 1s, 2s, 5s and 10s.	Revision from Year1 Pairs of numbers with a total of 10. Add near doubles to 10. Add 9 to numbers up to 20.	Revision from Year 1 Doubles to 10 Halves to 20 (even numbers) Doubles of all numbers up to 20.
Spring	Count in multiples of 1s, 2s, 5s and 10s (link to money) forwards and backwards Count in fractional steps up to 10 e.g. ¼, 2/4 (1/2), 3/4. 1, 1 ¼, 2 ¼	Addition and subtraction facts to 20. Derive related facts up to 100 eg 3+7 = 10, 30 + 70=100 Add 9 to numbers up to 20. Adding 19, 29, 39 etc to a number	Doubles of all numbers up to 20. Near doubles for numbers up to 20.
Summer	Count in multiples of 1s, 2s, 5s and 10s (link to money) forwards and backwards Count in time intervals – eg 2 o'clock, quarter past 2, half past 2, quarter to 3 Count in steps of 3 from 0 and 10s from any given number forwards and backwards.	Derive related facts up to 100 eg 3+7 = 10, 30 + 70=100 Adding near doubles to 20 Add 11 to a number Adding 21, 31 etc to a number	Doubles of multiples of 10 e.g. Double 40 Halving multiples of 10 Halves of odd numbers up to 10

YEAR 3 Blue text = previous learning			
	Counting	**Addition and subtraction**	**Multiplication and division**
Autumn	Revision from Y2 Count in 2, 3 and 5s from 0 (forwards and backwards) Counting in denominations of 2p, 5p and 10p Count in 10 from any number (forwards and backwards)	Revision from Y2 Pairs of multiples of 10, with totals up to 100, eg. 30 + 70 or 60 + ? = 100 10 and 100 more/less, eg. 1200 + 100 = Applying known patterns when mentally adding or subtracting by using the numbers in the ones column e.g. 7 + 5 = 12 so 37 + 5 = 42	Revision from Y2 Doubles to 20 e.g 17+17= Doubles to 50, eg. 27 + 27= Halves of even numbers to 50 Halves of odd numbers to 10
Spring	Count in 3s Count in 4,8, 50 and 100 from 0 (forwards) Count in 5-minute intervals e.g. 5 past, 10 past	Sums and difference of pairs of multiples of 10, 100 and 1000, eg. *50 + 80 = or 120 – 90 =* Add or subtract a near multiple of 10, eg. *125 + 9 = (125 +10 -1)* *685 – 9 = (685 - 10 +1)*	Doubles for multiple of 10 or 100 e.g. *Double 80* *Double 400* *Double 420* Halves for multiples of 10 or 100 e.g. *Half of 90* *Half of 900* *Half of 960*
Summer	Count in 3, 4, 6 and 8 from 0 (forwards and backwards) Count in fraction steps up to 20 (1/2, ¼, 1/3, 1/10)	Near doubles of a two-digit number, eg. *18 +16 = or 60 + 70 =* add and subtract numbers mentally, including: a three-digit number and 1s a three-digit number and 10s a three-digit number and 100s	Doubles and halves of powers of 10 to 100 Doubles and halves of powers of 100 to 1000

YEAR 4

Blue text = previous learning

	Counting	**Addition and subtraction**	**Multiplication and division**
Autumn	Revision from Y3 Count in 3, 4, 6 and 8 from 0 (forwards and backwards) Count in 50s and 100s (forwards and backwards) Count in 6, 7 and 9 (forwards) Count in 11, 12 from 0 (forwards)	Revision from Y3 Add and subtract 3-digit numbers and 1s Add and subtract near multiples of 10 e.g. 7, 8 and 9 e.g. 125+7= (125+5+2; 125+10-3) Find a 1000 more or less than a given number	Revision from Y3 *(link halves to 50%)* Halving numbers greater than 10 and less than 100 with odd and even numbers in the ones column. Multiplying by 0 and 1 and dividing by 1
Spring	Continue to count in 6, 7 and 9 (forwards and backwards) Continue to count in 11, 12 from 0 (forwards and backwards) Count in 25 and 1000 from 0 (100s forwards and backwards)	What must be added to any 2-digit number to make the next multiple of 10? e.g. 72 + ? = 80 What multiple of 10 must be added to a 3-digit multiple of 10 to make the next multiple of 100? e.g. 360 + ? = 400	Find ¼ or 25% of amounts using halving a half e.g. ¼ of 16 = (16 ÷ 2) ÷ 2 Multiply a multiple of 10 or 100 by a single digit number e.g. 40 x 3 → 4 x 3 = 12 → 12 x 10 = 120
Summer	Count in fractions and decimals 1/10 and 0.1 (forwards) Count in fractions and decimals 1/100 and 0.01 (forwards) Count backwards through 0 to include negative numbers	Add or subtract a near multiple of 100 to and 2-digit or 3-digit number e.g. 235 + 198 = 235 + 200 – 2 What must be added to a decimal or fraction to make one whole e.g. 0.2 + ? = 1; ¼ + ? = 1	Doubles and halves of decimals e.g. half of 5.6 double 3.4 Multiply pairs of multiples of 10 or 100 by a single digit number e.g. 60 x 30→ 6 x 3 = 18 → 18 x 100 = 1800

YEAR 5 Blue text = previous learning			
	Counting	**Addition and subtraction**	**Multiplication and division**
Autumn	Revision from Y4 • Counting forwards and backwards in multiples up to 12 x 12 • Count in a range of fractions (forwards and backwards) • Count in a range of decimals (forwards and backwards) • Count backwards and forwards below zero including negative numbers *(context of money or measure e.g. -3°C + 7°C)*	Revision from Y4 • What multiple of 10 must be added to a 3-digit multiple of 10 to make the next multiple of 100? e.g. 360 + ? = 400 • What multiple of 100 must be added to a 4-digit multiple of 100 to make the next multiple of 1000? e.g. 3600 + ? = 400	Revision from Y4 • Doubles and halves of whole numbers and decimals e.g. half of 72 double 3.4 • Multiply pairs of multiples of 10 or 100 by a single digit number e.g. 60 x 30→ 6 x 3 = 18 → 18 x 100 = 1800 • Calculate how many 25s or 50s are in a multiple of 100 e.g. 400 ÷ 25 = 16 —If there are 4 25s in 100, there are 8 25s in 200 • Dividing by 25, 50 or 100 a multiple of 25, 50 or 100 e.g. 150 ÷ 25 = 6 • Identify the closest multiple of a power of 10 up to 1,000,000 for any given number to 1,000,000 (rounding)
Spring	• Counting forwards and backwards in multiples up to 12 x 12 • Count forwards and backwards in steps of powers of ten for any given number up to 1,000,000 • Counting in mixed number fractions (forwards and backwards)- focus on equivalence e.g. 1/3 and 1/6; 1/6 and 1/12 ; 1/5 and 1/10	• What must be added to a decimal or fraction to make one whole e.g. 0.2 + ? = 1; ¼ + ? = 1 • Add or subtract near doubles of decimals e.g. 0.6 + 0.7; 2.5 + 2.6	• Multiply numbers to 20 by a single digit using mental partitioning e.g. 17 x 3 = (10 x 3) + (7 x 3) *(link to the distributive law)* • Divide a multiple of 10 by a single digit number e.g. 120 ÷ 4 = 30 • Multiple and divide 2-digit decimals e.g. 0.6 x 7 = 4.2; 4.8 ÷ 6 = 0.8 [NO TRICKS]- using known times table facts

Summer	• Counting forwards and backwards in multiples up to 12 x 12 • Mixed counting of fractions, decimals and percentages e.g. 0.25, ½ , 75%, 1	• Add or subtract two decimal numbers e.g. 4.8 + 3.1 (using estimation first) • Add or subtract a decimal and a whole number e.g. 7 + 4.3 • What must be added to a decimal or a fraction to be the next whole number? e.g. 7.2 + ? = 8; 5 ¾ + ? = 6	• Find 1% or 10% of amounts e.g. 10% of 400ml • Using times table facts to 12 x 12 scale up and down e.g. 3 oranges cost 24p; find the cost of 4 oranges.

YEAR 6 Blue text = previous learning			
	Counting	**Addition and subtraction**	**Multiplication and division**
Autumn	Revision from Y5 • Count forwards and backwards in steps of powers of ten for any given number up to 1,000,000 • Counting in mixed number fractions e.g. ¼, ½, ¾, 1, 1 ¼ (forwards and backwards) • Mixed counting of fractions, decimals and percentages e.g. 0.25, ½ , 75%, 1 • Counting in square numbers (forwards and backwards) • Counting in prime numbers (forwards and backwards) • Counting in cube numbers (forwards and backwards)	Revision from Y5 • Add or subtract bridging zero with one-digit negative numbers *(context of money or measure e.g. -3°C + 7°C)* • Find the missing number when adding or subtracting two decimals numbers with one decimal place e.g. 4.8 + ? = 8.9- (without regrouping)	Revision from Y5 • Multiple and divide 2-digit decimals e.g. 0.6 x 7 = 4.2; 4.8 ÷ 6 = 0.8 [NO TRICKS] • Commutative law to find a multiple of 10 to multiply by e.g. 4 x 7 x 5 = 4 x 5 x 7 = 20 x 7 = 140 • Distributive law e.g. 3.7 x 99 = 3.7 x (100 -1) • Associative law e.g. 15 x 33 =(5 x 3) x 33 or (3 x 33) x 5 = 5 x 99 = 495
Spring	• Mixed counting of fractions, decimals and percentages e.g. 0.25, ½ , 75%, 1 • Counting in measures e.g. 250g, 500g, 750g, 1kg • Counting in square numbers (forwards and backwards) • Counting in prime numbers (forwards and backwards) • Counting in cube numbers (forwards and backwards)	• Add or subtract two decimal numbers e.g. 4.8 + 3.1 (using estimation first) • Find the missing number when adding or subtracting two decimals number s with two decimal places. 4.8 + ? = 8.9	• Convert between improper fractions and mixed numbers using times tables facts e.g. convert 7 1/3 → 22/3; 36/5 → 7 1/5 • Find simple equivalent fractions using times table facts • To calculate division with remainder involving times table facts 12 x 12 e.g. 45 ÷ 6 = 7 r 3

Summer	• Counting forwards and backwards in multiples up to 12 x 12 • Counting in measures e.g. 250g, 500g, 750g, 1kg	• Add or subtract two decimal numbers e.g. 4.8 + 3.1 (using estimation first) • Find the missing number when adding or subtracting two decimals number s with two decimal places. 4.8 + ? = 8.9	• Find 1% or 10% of amounts e.g. 10% of 400ml • Associative law e.g. 15 x 33 =(5 x 3) x 33 or (3 x 33) x 5 = 5 x 99 = 495