Math Calculation Policy

Version	Document Title	Status	Author	Approved by	Date	Review Date
0.1	Math Calculation Policy	Final	SLT	Principal/Vice Principal	August 2021	August 2022
Regional Director		Principal		Vice Principal		
Head of Foundation Stage		Head of Primary		Head of Secondary		

Aims

The mathematics teaching at Newlands School, Dubai - is geared towards enabling each student to exceed; not only the mathematics skills and understanding required for later life but also an enthusiasm for and fascination about mathematics itself.

We endeavour to increase student confidence in mathematics so that they are able to express themselves and their ideas using the language of mathematics with assurance.
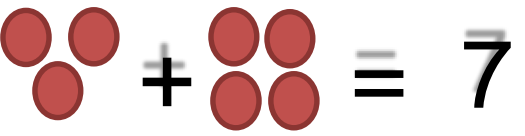
Our aim is that the children see a clear link between mental strategies and written methods. They are encouraged to ask themselves, "Do they need a written method?" before attempting a question. For calculations that they cannot do in their heads, they choose an appropriate written method which they can use accurately and with confidence. Time must be taken to build up to the most efficient method to ensure complete understanding at each stage.

The intention of this policy is to show clear progression and a systematic approach in written and mental strategies taught to children in EYFS through to Year 6. Whilst each step is given as an expectation for the end of each year group, when the child is exceeding expectations and is ready to move onto the next step, teachers should be quick to introduce that next stage of learning always ensuring challenge and depth to the students learning.
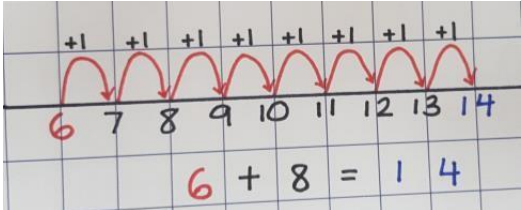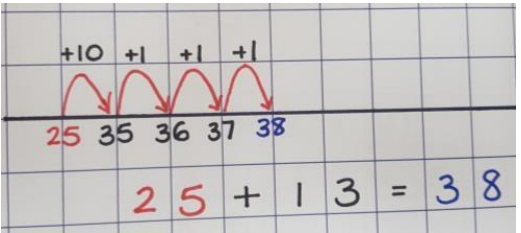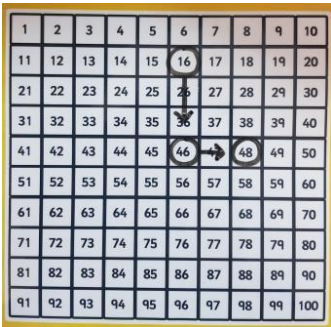
Students should be encouraged to use and apply each method in various real-life scenarios such as 'money problems' and 'measure problems'. By the end of Phase 2, students are confident with decimals and have an in-depth knowledge of the place value system and how it can be manipulated in order to help them: add, subtract, multiply and divide efficiently, effectively and accurately.
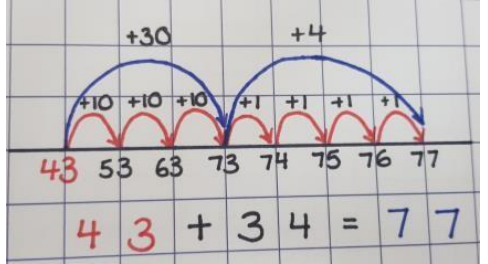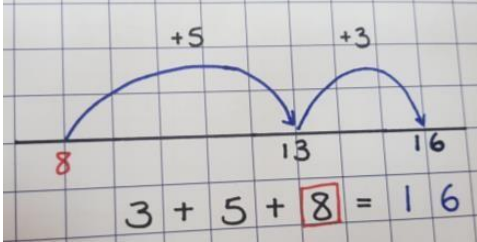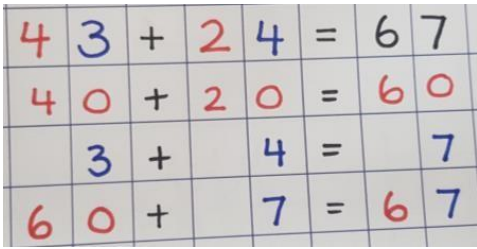
Addition

Learning Stage: EYFS

Learning Objectives	Mental Recall/Jottings	Written Methods
• ELG – Children count reliably with numbers from 1 to 20, place them in order and say which number is one more or one less than a given number. Using quantities, they add and subtract two single digit numbers and count on or back to find the answer. • Exceeding – Children estimate a number of objects and check quantities by counting up to 20.	Counting up in 1s	**Adding with visual representation (objects)** – count up/record the total of the two groups

Learning Stage: Year 1

Learning Objectives	Mental Recall/Jottings	Written Methods
• Read, write and interpret mathematical statements involving addition (+), subtraction (−) and equals (=) signs • Represent and use number bonds and related subtraction facts within 20 • Add and subtract one-digit and two-digit numbers to 20, including 0 • Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = ? - 9$	• Adding 1 more to any given number *This can be done verbally (holding the number in their head and counting on, not starting from zero* • Number bonds to 10 and 20 *Being able to recall number bonds* *$3 + ? = 10$*	**Counting on using a number line in ones** **Counting on in tens and ones using a number line** **Counting on in tens and ones using a 100 square - 16 + 32 = 48**

Learning Stage: Year 2

Learning Objectives	Mental Recall/Jottings	Written Methods
• Solve problems with addition and subtraction: ▪ Using concrete objects and pictorial representations, including those involving numbers, quantities and measures ▪ Applying their increasing knowledge of mental and written methods • Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 • Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: ▪ A two-digit number and 1s ▪ A two-digit number and 10s 2 two-digit numbers ▪ Adding 3 one-digit numbers • Show that addition of 2 numbers can be done in any order (commutative) and subtraction of 1 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	• Counting on in tens and ones *Starting from a given number counting on* *e.g. 34 → 44 → 54* • Number bonds to multiples of 10 (tidy number) *Understand what number to add to get to the next multiple of ten* *34 + ___ = 40* • Doubling numbers up to 20	**Counting on in tens and ones on a number line** *Begin to count on in groups of tens and ones* **Adding 3 numbers on a number line** *Start from the largest number and add on* **Partitioning with 2 digit numbers**

Expanded column method with no carrying
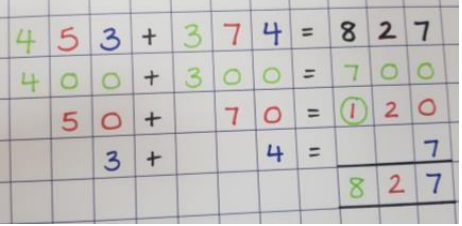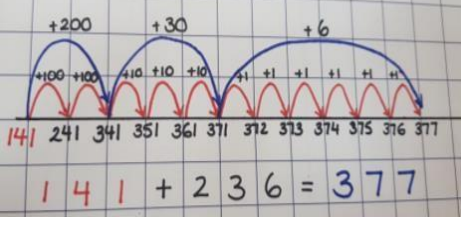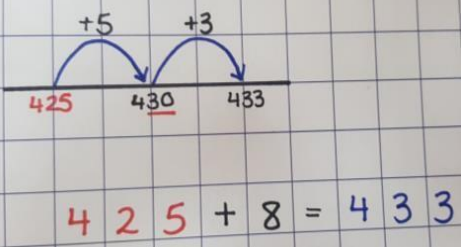
Discuss partitioning but in a column method,

ensure numbers are written in the correct columns

Column method with no carrying

Ensure children understand the value of the digits and that we are adding 40 + 20 not 4 + 2

Learning Stage: Year 3

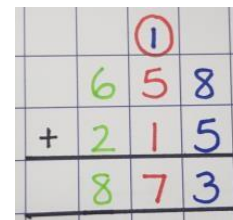| Learning Objectives	Mental Recall/Jottings	Written Methods

• Add and subtract numbers mentally, including:
  ▪ A three-digit number and 1s
  ▪ A three-digit number and 10s
  ▪ A three-digit number and 100s
Add and subtract numbers with up to 3 digits, using formal written methods of columnar addition and subtraction
Estimate the answer to a calculation and use inverse operations to check answers
• Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction
	• Adjusting: $146 + 9 = 146 + 10 - 1 = 155$
	Can also identify when a number is close to a multiple of ten to use this method
	• Partitioning 2-digit numbers: $34 + 25 = 30 + 20 + 4 + 5 = 59$
	• Partition one number, add on tens and ones: $57 + 36 = 57 + 30 + 6 = 93$
	• Counting forwards in multiples of hundred, tens and ones
	Starting from a given number counting on e.g. $324 + 200 \rightarrow 524$, understanding that only the hundreds column will change
	• Doubling numbers
	Can also use knowledge of partitioning to double larger numbers
		Partitioning with 3-digit numbers
		
		Students to show each step of adding with partitioning
		
		Counting on in hundreds, tens and ones on a number line
		
		Begin to count on in multiples of hundreds, tens and ones, linking to place value knowledge
		
		Bridging to ten (tidy numbers) $425 + 8 = 425 + 5 + 3 = 433$
		
		A tidy number is the next multiple of ten

Expanded column method with carrying

Ensure students understand the carry is a ten/hundred not a one

Column addition with carrying
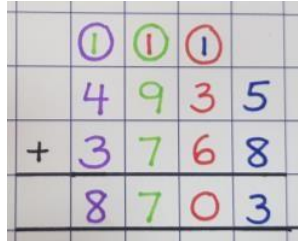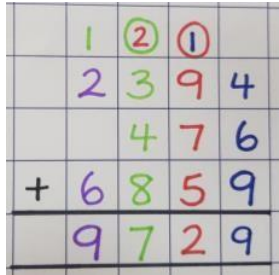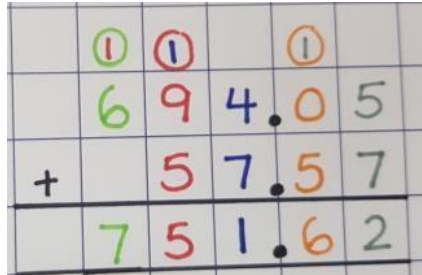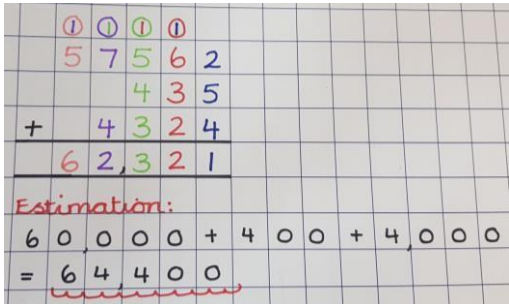
Carry on top

Learning Stage: Year 4

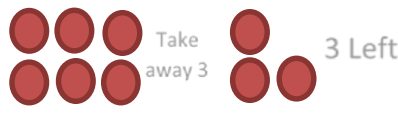| Learning Objectives	Mental Recall/Jottings	Written Methods
• Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate Estimate and use inverse operations to check answers to a calculation • Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why	• Bridging through multiples of ten 456 + 27 = 456 + 20 + 4 + 3 = 483 *A tidy number is the next multiple of ten* • Near doubles 60 + 62 = double 60 + 2 = 122 Reordering of numbers: 34 + 59 + 26 = 34 + 26 (number bonds) = 60 + 59 = 119 *Using prior knowledge and reasoning to order number, by value or use of other methods, such as doubling, adjusting or number bonds* • Partitioning 3-digit numbers: 342 + 535 = 300 + 500 + 40 + 30 + 2 + 5 = 877 • Rounding and adjusting: 123 + 78 = 123 + 80 − 2 = 201 *Being able to identify when to use this method, what numbers are close to multiples of ten* • Bridging through 60 when calculating time: 45minutes + 32 minutes = 45 + 15 + 17 = 1hour and 17 minutes	**Column addition with carrying** *Ensure students understand the carry is a ten/hundred not a one* *Carry on top* **Column addition with more than 2 numbers** **Column addition with money (all to 2-decimal place)** *Ensure 2-decimal places are used for all money (all currencies to be used when taught) even if it is 0.00*

Learning Stage: Year 5

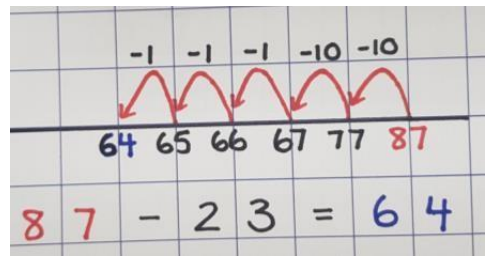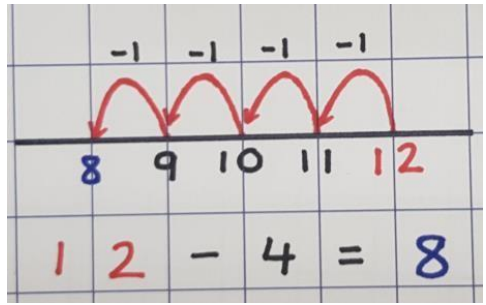| Learning Objectives	Mental Recall/Jottings	Written Methods
• Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) • Add and subtract numbers mentally with increasingly large numbers • Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy • Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why	• Mentally add larger numbers using a range of strategies • Deciding which method is best to use for a particular sum *Giving reasons supporting which method they have chosen (look at previous year groups to see all strategies taught)*	**Column addition with estimation (using rounding skills) with a range of different amounts of digits**

Learning Stage: Year 6

Learning Objectives	Mental Recall/Jottings	Written Methods
• Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why • Solve problems involving addition, subtraction, multiplication and division • Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy	• Number bonds to 1 whole to mentally add decimals: $5.7 + 8.3 = 5 + 8 + 0.7 + 0.3 = 14$ Partitioning of whole and decimal numbers to add mentally • Mentally add increasingly larger numbers using a range of strategies • Deciding which method is best to use for a particular sum *Giving reasons supporting which method they have chosen (look at previous year groups to see all strategies taught)*	**Column addition with estimation (using rounding skills)** **Column addition adding a range of numbers with different amounts of digits and decimals**

Subtraction

Learning Stage: EYFS

Learning Objectives	Mental Recall/Jottings	Written Methods
• ELG – Children count reliably with numbers from 1 to 20, place them in order and say which number is one more or one less than a given number. Using quantities they add and subtract two single digit numbers and count on or back to find the answer.	Counting back in 1s	**To physically take away objects and count/record the remaining objects.**

Learning Stage: Year 1

Learning Objectives	Mental Recall/Jottings	Written Methods
• Read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs • Represent and use number bonds and related subtraction facts within 20 • Add and subtract one-digit and two-digit numbers to 20, including 0 • Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = ? – 9	• Finding 1 less than any given number *This can be done verbally (holding the number in their head and counting backwards* • Number bonds to 10 and 20: 20 – 12 = 8	**Counting back on using a number line in ones** **Counting back in tens and ones using a number line**

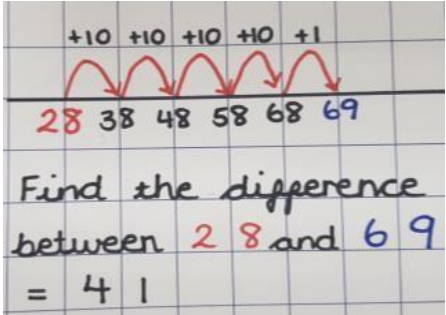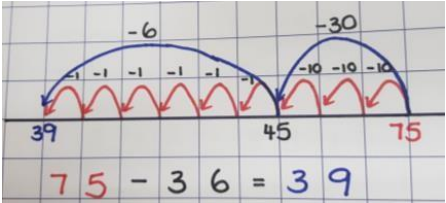**Crossing out picture representations of numbers**

$8 - 3 = 5$

Counting back in tens and ones using a 100 square

36 - 24 = 16

Learning Stage: Year 2

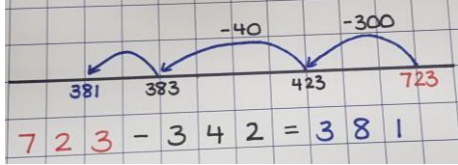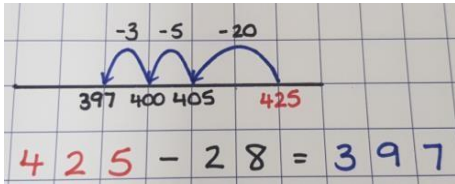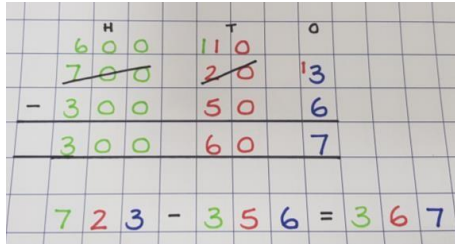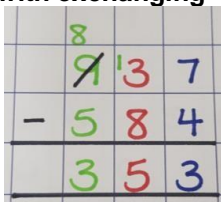| Learning Objectives	Mental Recall/Jottings	Written Methods

• Solve problems with addition and subtraction:
  ▪ Using concrete objects and pictorial representations, including those involving numbers, quantities and measures
  ▪ Applying their increasing knowledge of mental and written methods
• Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100
• Add and subtract numbers using concrete objects, pictorial representations, and mentally, including:
  ▪ A two-digit number and 1s
  ▪ A two-digit number and 10s 2 two-digit numbers
  ▪ Adding 3 one-digit numbers
• Show that addition of 2 numbers can be done in any order (commutative) and subtraction of 1 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
	• Counting back in tens and ones
	Starting from a given number counting back e.g. 84 → 74 → 64
	• Subtracting 1s from a multiple of ten: 80 – 6
	Using knowledge of number bonds to 10
		Find the difference – counting on, using a numberline
		
		Counting back in tens and ones (one jump) on a numberline/100 square
		
		Partitioning to subtract with no exchanging: 89 – 57 = 80 – 50 + 9 – 7 = 32
		
		Using vocabulary exchange NOT borrowing

Expanded column method with no exchanging

Discuss partitioning but in a column method, ensure numbers are written in the correct columns

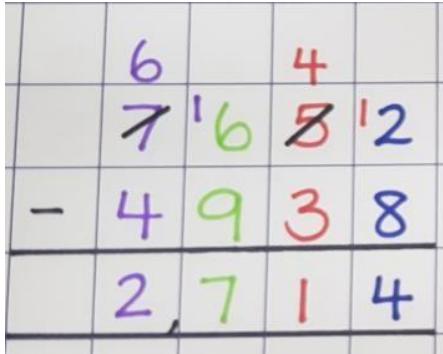**Column subtraction (decomposition method) with no exchanging**

Ensure children understand the value of the digits and that we are subtracting 70 + 40 not 7 + 4, discuss place value columns

Learning Stage: Year 3

Learning Objectives	Mental Recall/Jottings	Written Methods

• Add and subtract numbers mentally, including:
  ▪ a three digit number and 1s
  ▪ a three-digit number and 10s
  ▪ a three-digit number and 100s
  ▪ Add and subtract numbers with up to 3 digits, using formal written methods of columnar addition and subtraction
• Estimate the answer to a calculation and use inverse operations to check answers
• Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction
	• Adjusting: 146 - 9 = 146 - 10 + 1 = 137
	• Partitioning 2-digit numbers without exchanging: 87 - 43 = 80 - 40 + 7 - 3 = 44
	• Counting backwards in multiples of 10 and 100
	
	Starting from a given number counting back e.g. 824 - 200 → 624, understanding that only the hundreds column will change
		Counting back in hundreds, tens and ones on a number line
		
		Partition the number into values
		
		Bridging to the next multiple of 10 (tidy numbers)
		425 - 28 = 425 – 20 - 5 - 3 = 397
		
		A tidy number is the next multiple of ten
		
		Expanded column method with exchanging using 3digit numbers
		
		Understanding to partition the number and exchange from the column to the left. Exchange for 10/100 not just 1
		
		Column subtraction (decomposition method) with exchanging

Learning Stage: Year 4

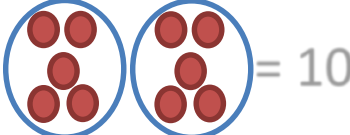| Learning Objectives	Mental Recall/Jottings	Written Methods
• Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate • Estimate and use inverse operations to check answers to a calculation • Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why	• Bridging to 10 (tidy numbers) 425 - 8 = 425 - 5 - 3 = 427 *A tidy number is the next multiple of ten* • Calculate small differences by counting up *Identifying when the difference between 2 numbers is close* • Partitioning of the number being subtracted: 543 – 34 – 543 – 30 – 4 = 509 • Rounding and adjusting: 123 - 78 = 123 - 80 + 2 = 41 *Being able to identify when to use this method, what numbers are close to multiples of ten*	**Column subtraction (decomposition method) with exchanging** *Ensure they can subtract different amounts of digits up to 1,000* **Column subtraction (decomposition method) with money (all to 2 decimal places)** *Ensure 2-decimal places are used for all money (all currencies to be used when taught) even if it is 0.00*

Learning Stage: Year 5

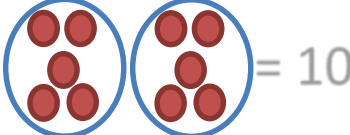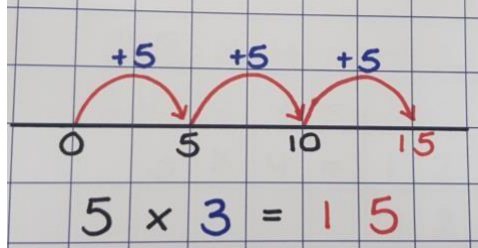| Learning Objectives	Mental Recall/Jottings	Written Methods
• Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) • Add and subtract numbers mentally with increasingly large numbers • Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy • Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why	• Mentally subtract larger numbers using a range of strategies • Deciding which method is best to use for a particular subtraction *Giving reasons supporting which method they have chosen (look at previous year groups to see all strategies taught)*	**Column subtraction (decomposition method) with estimation (using rounding skills) with a range of different amounts of digits**

Learning Stage: Year 6

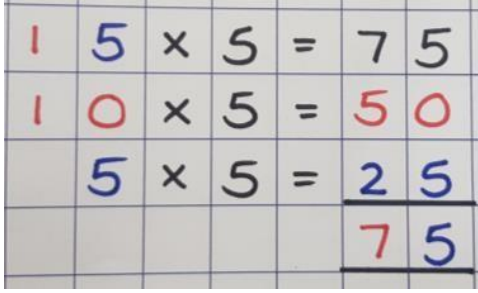| Learning Objectives	Mental Recall/Jottings	Written Methods
• Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why • Solve problems involving addition, subtraction, multiplication and division • Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy	• Number bonds to 1 whole to subtract a decimal from a whole number: 34 – 0.3 = 33.7 • Partitioning of whole and decimal numbers to subtract mentally • Mentally subtract increasingly larger numbers using a range of strategies • Deciding which method is best to use for a particular subtraction *Giving reasons supporting which method they have chosen (look at previous year groups to see all strategies taught)*	**Column subtraction (decomposition method) with estimation (using rounding skills)** **Column subtraction (decomposition method) using a range of numbers including decimals** *Ensure they know to put a 0 as a place holder if no digit is there*

Multiplication

Learning Stage: EYFS

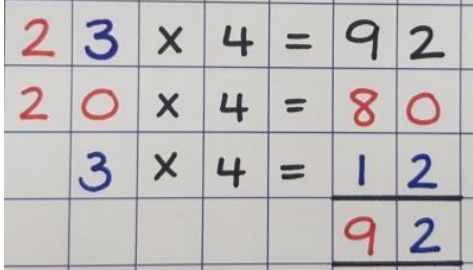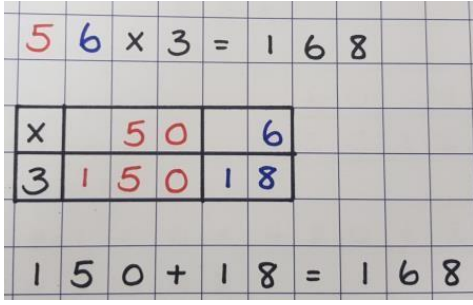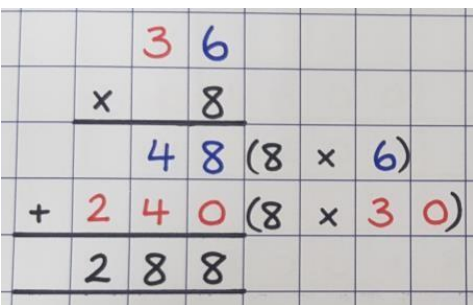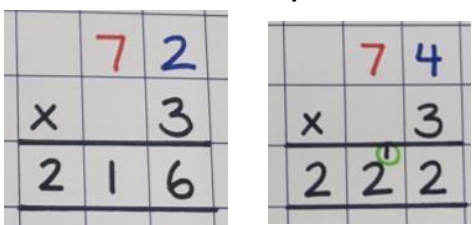| Learning Objectives	Mental Recall/Jottings	Written Methods
• ELG - They can solve problems including doubling, halving and sharing • Exceeding – They can solve practical problems that involve combining groups of 2, 5 or 10, or share into equal groups.	• Count up in ones, clapping for every multiple of 2 • Recognise multiples of 10 – with a zero on the end	'**Groups of**' **using objects as a representation: 2 groups of 5. Adding up the total altogether** **Doubling with repeated addition using objects: double 6 = 6 + 6 = 12**

Learning Stage: Year 1

Learning Objectives	Mental Recall/Jottings	Written Methods
• Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.	• Doubling numbers up to 20 using repeated addition • Recall 2 multiplication tables	'**Groups of**' **using objects as a representation: 2 groups of 5. Adding up the total altogether** **Repeated addition on a numberline: 5 x 3 = 5 + 5 + 5 = 15** *Understand it is 3 jumps of 5*

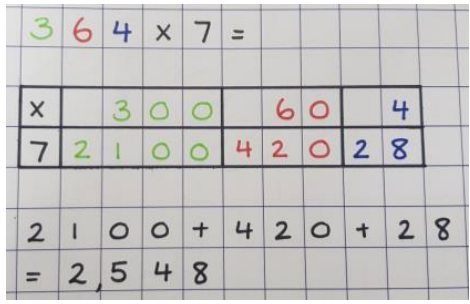|		
		Arrays, counting up the dots *Understand multiplication has a commutative property (can be completed in any order)*

Learning Stage: Year 2

Learning Objectives	Mental Recall/Jottings	Written Methods
• Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers • Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs • Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot • Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.	• Recall 2, 5 and 10 multiplication tables • Recall of doubling up to 20 • Identifying odd and even numbers	**Arrays, counting up the dots** *Understand multiplication has a commutative property (can be completed in any order)* **Partitioning 15 x 5 = 10 x 5 + 5 x 5 = 50 + 25 = 75** *A teen number multiplied by 5*

Learning Stage: Year 3

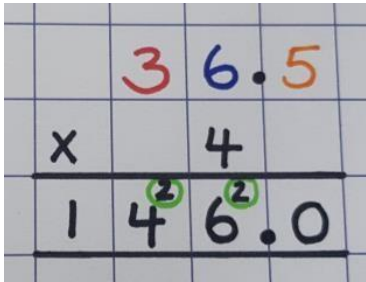| Learning Objectives	Mental Recall/Jottings	Written Methods
• Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables • Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods	• Recall 2, 3, 4, 5, 8 and 10 multiplication tables • Multiplying by 10 *Understand that when we multiply by ten all the digits move one place LEFT (NOT add a zero) and a zero is put in as a* **place holder** • Multiplying by multiples of ten *Multiply by the number in the tens column, then multiply by 10* ***e.g. 5 x 60 =*** ***5 x 6 = 30 x 10 = 300***	**Partitioning 23 x 4 = 20 x 4 + 3 x 4 = 80 + 12 = 92** **Grid method for 1-digit multiplied by a 2/3-digit number** *Partition the numbers into their values* **Expanded column method for multiplication** **Short method for multiplication** *Carrying over for multiplication is circled in green*

Learning Stage: Year 4

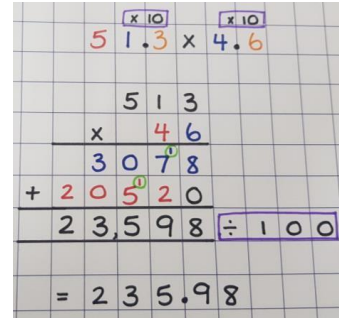| Learning Objectives	Mental Recall/Jottings	Written Methods
• Recall multiplication and division facts for multiplication tables up to 12 × 12 • Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers • Recognise and use factor pairs and commutativity in mental calculations • Multiply two-digit and three-digit numbers by a one-digit number using formal written layout	• Derive and recall all multiplication facts up to 12 x 12 • Multiplying by 10, 100, 1000 *Understand that when we multiply by powers of ten all the digits move to the LEFT (depending on the amount of zeros) and a zero(s) is put in as a **place holder(s)*** • Multiplying by multiples of ten *Multiply by the number in the tens column, then multiply by 10* *e.g. 5 x 60 = 5 x 6 = 30 x 10 = 300* • Partitioning: 15 x 4 = 10 x 4 + 5 x 4 = 40 + 20 = 60 • Multiplying by 0 and 1 • Multiple 3 numbers using factors: 2 x 2 x 3 = 4 x 3 or 2 x 6 = 12	**Grid method for 1-digit multiplied by a 3-digit number** **Expanded column method for multiplication** *Carry's circled in red are from the addition sum after* **Short method for multiplication** **Grid method for 2-digit x 2-digit** *Allow move on to if students are confident with all methods above*

Learning Stage: Year 5

Learning Objectives	Mental Recall/Jottings	Written Methods
• Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers • Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers • Establish whether a number up to 100 is prime and recall prime numbers up to 19 • Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers • Multiply and divide numbers mentally drawing upon known facts • Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000	• Derive and recall quickly all multiplication facts up to 12 x 12 • Multiplying decimals by 10, 100, 1000 *When multiplying a decimal by a power of ten note that the digits move to the left (the decimal point and place value columns NEVER move)* • Multiplying by multiples of 10, 100, 1000: 50 x 7 = 5 x 7 = 35 x 10 = 350 • Partitioning 23 x 6 = 20 x 6 + 3 x 6 = 120 + 18 = 138 • Multiple 3 numbers using factors: 2 x 2 x 3 = 4 x 3 or 2 x 6 = 12 • Recall and identification of squared numbers	**Grid method for 2-digt x 2/3-digit** **Long multiplication** *Understand that 0 is a place holder for multiplying by a multiple of ten (use brackets to show understanding)* *Carry's for multiplication are circled in green and for the addition sum in red*

Learning Stage: Year 6

Learning Objectives	Mental Recall/Jottings	Written Methods
• Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication • Perform mental calculations, including with mixed operations and large numbers • Identify common factors, common multiples and prime numbers	• Derive and recall quickly all multiplication facts up to 12 x 12 • Multiplying decimals by 10, 100, 1000 *When multiplying a decimal by a power of ten note that the digits move to the left (the decimal point and place value columns NEVER move)* • Multiplying by multiples of 10, 100, 1000: 50 x 7 = 5 x 7 = 35 x 10 = 350 • Multiplying by decimals: 0.7 x 5 = 7 x 5 = 35 ÷ 10 = 3.5 • Partitioning 23 x 6 = 20 x 6 + 3 x 6 = 120 + 18 = 138 • Use of factors: 8 x 4 x 3 = 8 x 12 • Recall and identification of squared and cubed numbers	**Long multiplication to solve 3/4-digits x 2-digits** *Understand that 0 is a place holder for multiplying by a multiple of ten (use brackets to show understanding)* *Carry's for multiplication are circled in green and for the addition sum in red* **Decimal multiplied by a whole number** *Understand they have to start in the tenths/hundredths column as we have to ÷ by a power of ten* *Carry's for multiplication in green*

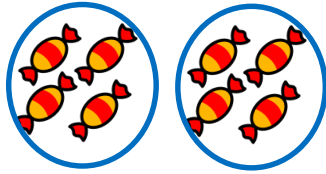**Decimal multiplied by a decimal**

Only move on to this method if understanding of long multiplication is secure

Understand they have to multiply by powers of ten to create 2 whole numbers and divide by this power of ten at the end to get the answer
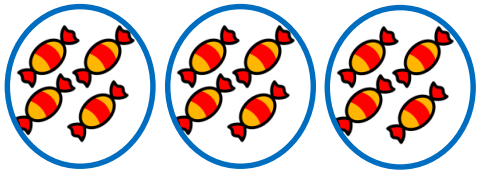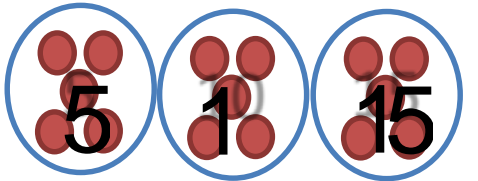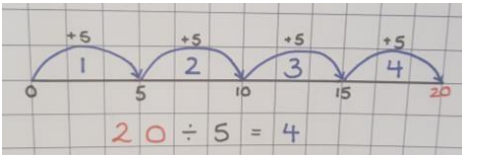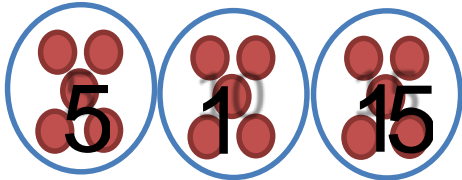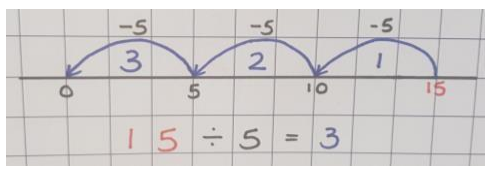
Carry's for multiplication in green

Division

Learning Stage: EYFS

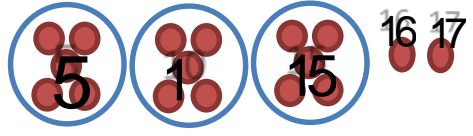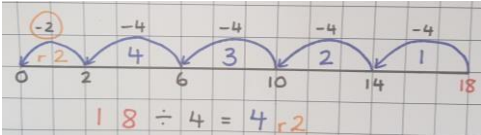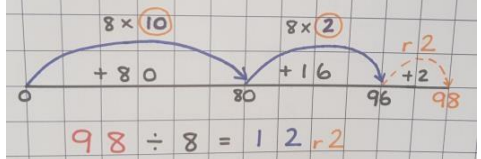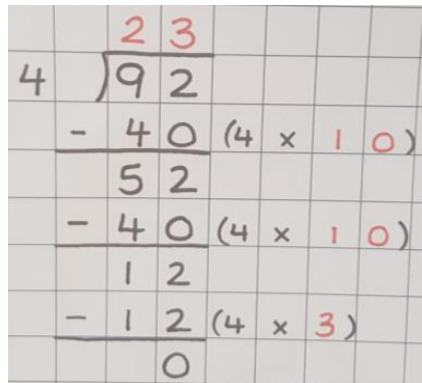| Learning Objectives	Mental Recall/Jottings	Written Methods
• ELG - They can solve problems including doubling, halving and sharing • Exceeding – They can solve practical problems that involve combining groups of 2, 5 or 10, or share into equal groups.	• Understand the term share *Being able to share objects with a partner*	**Sharing in equal groups, using objects: share 8** *Sharing equally with a partner (practically), checking each group has the same amount*

Learning Stage: Year 1
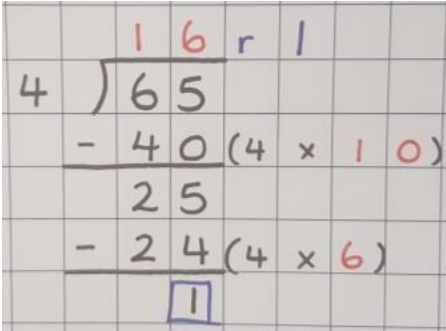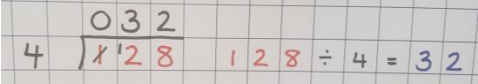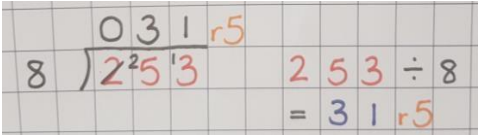
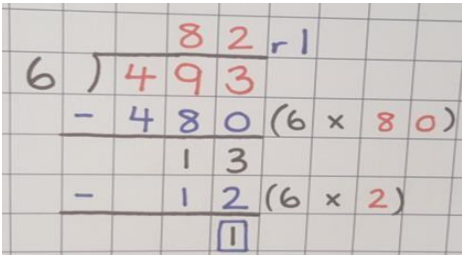| Learning Objectives	Mental Recall/Jottings	Written Methods
• Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.	• Halving numbers under 20 *Starting to recall halving numbers*	**Sharing: Share 12 sweets between 3 people** *Can do this practically sharing objects with partners* **Grouping: How many groups of 5 can I make out of 15?** *3 groups of 5 make 15* **Jumps on a number line: 20 ÷ 5 = 4 (counting up in 5s on the number line** *Count up the amount of jumps taken to get to zero*

Learning Stage: Year 2

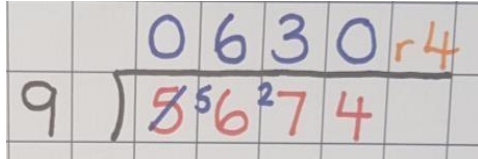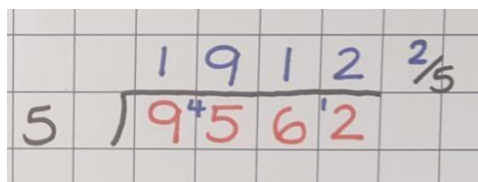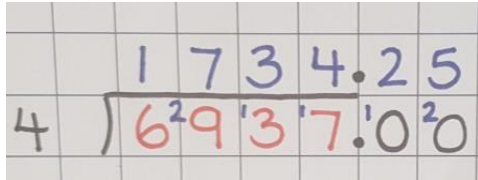| Learning Objectives	Mental Recall/Jottings	Written Methods
• Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers • Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs • Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot • Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.	• Division facts from 2, 5 and 10 multiplication tables	**Grouping: How many groups of 5 can I make out of 15?** *3 groups of 5 make 15* **Repeated subtraction on a number line**

Learning Stage: Year 3

Learning Objectives	Mental Recall/Jottings	Written Methods
• Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables • Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one digit numbers, using mental and progressing to formal written methods	• Division facts from 2, 3, 4, 5, 8 and 10 multiplication tables • Dividing by 10 *Understand that when we divide by ten all the digits move one place RIGHT (NOT take away a zero)*	**Grouping: How many groups of 5 can I make out of 17?** *3 groups of 5 with 2 left over (remaining)* **Repeated subtraction on a number line with remainders** *Find larger multiples of the number (chunks)* **Chunking on a number line with remainders** **Chunking as long division** *Subtract multiples of 4 that they know until they get down to zero (or below 4)*

Chunking as long division with remainders

Short division (bus stop method)

Short division (bus stop method) with remainders
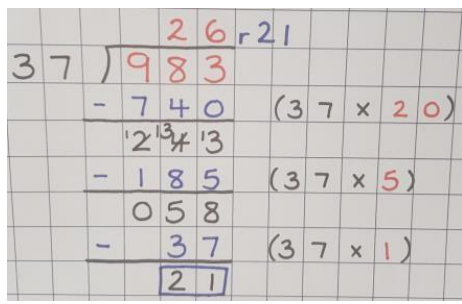
Learning Stage: Year 4

Learning Objectives	Mental Recall/Jottings	Written Methods
• Recall multiplication and division facts for multiplication tables up to 12 × 12 • 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 calculations	• Derive and recall all multiplication facts up to 12 x 12 • Dividing by 10, 100, 1000 *Recognising that the digits move to the right (the zero(s) are not just removed). **E.g 4,500 ÷ 100 = 45*** • Dividing by multiples of 10 *For example, if they know 32 ÷ 4 = 8 they can identify that 320 ÷ 4 = 80 etc.* • Chunking mentally: 64 ÷ 4 = (40 ÷ 4) + (24 ÷ 4) = 10 + 6 = 16 • Dividing by 1	**Chunking as long division and with remainders (HTO ÷ O) subtract multiples of ten** **Short division (bus stop method) with remainders with 3 or 4-digit numbers**

Learning Stage: Year 5

Learning Objectives	Mental Recall/Jottings	Written Methods
• Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers. • Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers • Establish whether a number up to 100 is prime and recall prime numbers up to 19 • Multiply and divide numbers mentally drawing upon known facts • Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context • Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000	• Derive and recall quickly all multiplication facts up to 12 x 12 • Dividing by 10, 100, 1000 into decimals *When dividing by a power of ten note that the digits move to the right (the decimal point and place value columns NEVER move) decimal numbers may be created. A place holder is put in in front of the decimal point if no value.* **E.g 45 ÷ 100 = 0.45** • Dividing by multiples of 10: 210 ÷ 7 = 30 Chunking: 132 ÷ 4 = (120 ÷ 4) + (12 ÷ 4) = 20 + 3 = 23 • Identify square root of first 12 squared numbers • Identify prime factor (prime factor trees)	**Short division with increasingly larger numbers with remainders represented as a remainder, fraction and decimal.** *As a remainder* *As a fraction* *As a decimal*

Learning Stage: Year 5

Learning Objectives	Mental Recall/Jottings	Written Methods
• Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context • Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context • Perform mental calculations, including with mixed operations and large numbers • Identify common factors, common multiples and prime numbers	• Derive and recall quickly all multiplication facts up to 12 x 12 • Dividing by 10, 100, 1000 into decimals *Look at rules as above* • Dividing by multiples of 10: 210 ÷ 7 = 30 • Chunking: 132 ÷ 4 = (120 ÷ 4) + (12 ÷ 4) = 20 + 3 = 23 • Identify square root of first 12 squared numbers • Identify prime factor and common factors Relating multiplication facts to divide decimals: e.g. 3.2 ÷ 4 = 0.8	**Short division with increasingly larger numbers, interpreting remainders as per context** **Chunking (long division) HTO ÷ TO** *See examples above, but use appropriately for context of question*