Year 4

Lower Key Stage 2

The principal focus of mathematics teaching in lower key stage 2 is to ensure that pupils become increasingly fluent with whole numbers and the four operations, including number facts and the concept of place value. This should ensure that pupils develop efficient written and mental methods and perform calculations accurately with increasingly large whole numbers.

Addition and subtraction: Children are taught to use place value and number facts to add and subtract numbers mentally and they will develop a range of strategies to enable them to become less reliant on the 'counting in 1s' or fingers-based methods of Key Stage 1. In particular, children will learn to add and subtract multiples and near multiples of 10, 100 and 1000 (year 4) and will become fluent in complementary addition as an accurate means of achieving fast and accurate answers to 3-digit subtractions. Standard written methods for adding larger numbers are taught, learned and consolidated, and written column subtraction is also introduced.

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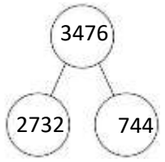
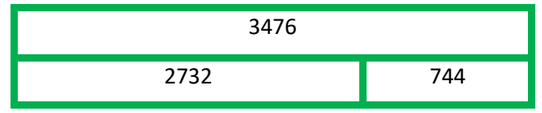
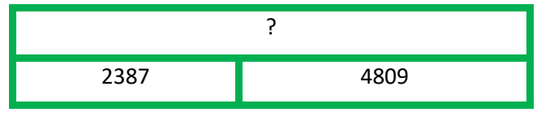
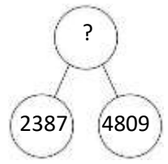
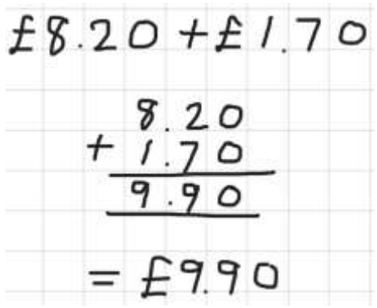
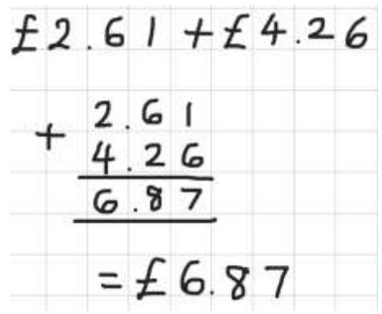
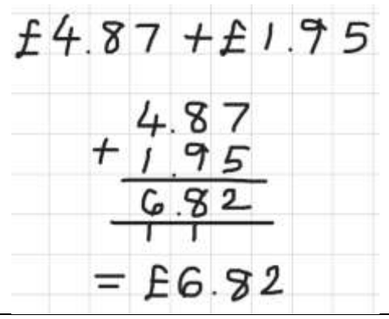
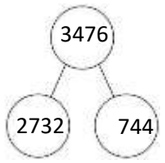
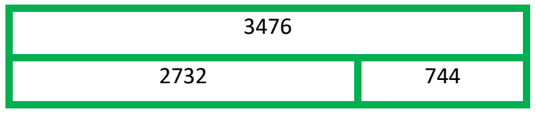
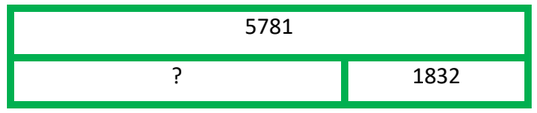
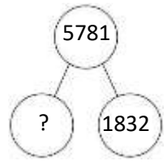
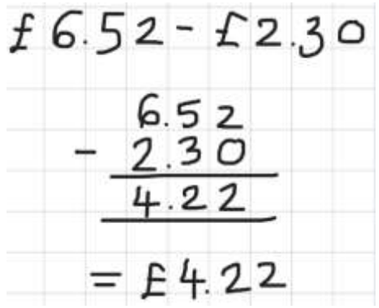
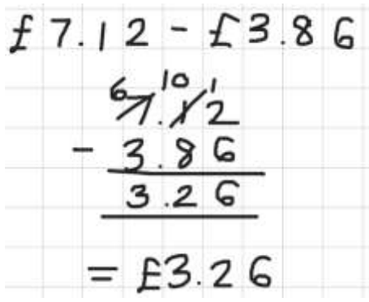
	National Curriculum Objectives	Mental Calculation	Written Calculation
Y4 +	**Add numbers with up to 4 digits using the formal written methods of columnar addition where appropriate** **Estimate and use inverse operations to check answers to a calculation** **Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why**	Simple mental addition to ensure no errors with column addition. Use of place value to find 10, 100 or 1000 more. Use of place value to find more than a given number and including in negative numbers. **For example: Find 3 more than -8.** Use number line initially, then jottings and then mentally Relate number bonds to 10 to number bonds to 100 and 1000 (e.g. 3 + 7 = 10 so 30 + 70 = 100 therefore 300 + 700 = 1000 and be able to recall them.	**Continue to use part whole models and bar models** **Use to represent related addition and subtraction facts.**  2732 + 744 = 3476 744 + 2732 = 3476 **So…** 3476 – 2732 = 744 3476 – 744 = 2732  **Use to help solve missing number problems/ inverse. Use to check answers to a calculation.** We know that 2387 + 4809 = ? We can help visualise this problem by putting it into a bar model (or part whole model) like on the right, now we know we need to add them together. We can do 2387 + 4809 to find our missing number (=7196). We can now do 7196 – 2387 to check. If we get 4809 we are correct.   **Column addition for up to two 4-digit number, with 1 or more regrouping** Use of (compact) column addition with up to two 4-digit numbers (may also do 4 digit number + 3 digit number, or three 4 digit numbers added together etc). May have no regrouping, one regroup or multiple regroups. **Regroup once** 5162 +3497 8659 1 Starting with the ones, add each column in turn. When adding 6 tens + 9 tens = 15 tens = 1 hundred = 5 tens. Place 1 hundred under the equal sign on the hundred column and the 5 tens in the answer ('hang it on the washing line') **Regroup multiple times** 5864 +3497 9361 1 1 1 Starting with the ones, add each column in turn. Regroup tens, hundreds and/or thousands as required ('hang it on the washing line')

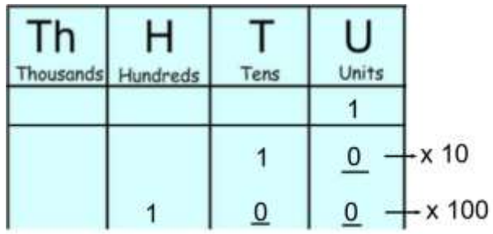
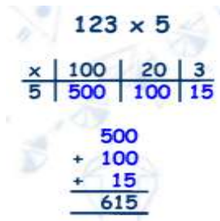
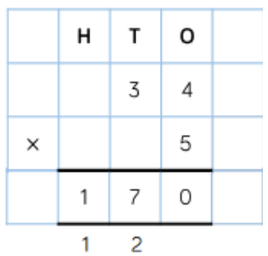
NB: Emphasis to be made on the place value of each digit and when introduced in Y4 (already done version of this in Y2 and Y3) to the method children should be shown it with counters and place value grid on the IWB to model regrouping.

If need practical apparatus - use Numicon or Base 10 to model the regrouping.

Y4 + continued	(See above)	(See above)	**<u>Column addition for decimals</u>** Use of (compact) column addition for numbers with the same amount of decimal places **For example**: when solving addition problem with a money context that goes into the decimal system with tenths and hundredths For two amounts with same number of decimal places (only tenths):  For two amounts with same number of decimal places (tenths and hundredths):  For two amounts with same number of decimal places (tenths & hundredths) and require regrouping: 

Y4 –	**Subtract numbers with up to 4 digits using the formal written methods of columnar 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**	Simple mental subtraction to ensure no errors with column subtraction. Use of place value to find 10, 100 or 1000 less. Use of place value to find less than a given number and going into negative numbers. **For example: Find 7 less than 2.** Use number line initially, then jottings and then mentally	**Continue to use part whole models and bar models** **Use to represent related addition and subtraction facts.**  2732 + 744 = 3476 744 + 2732 = 3476 **So…** 3476 – 2732 = 744 3476 – 744 = 2732  **Use to help solve missing number problems and represent inverse**. We know that 5781 - ? = 1832 We can help visualise this problem by putting it into a bar model (or part whole model) like on the right. Now we can see the other subtraction we need to do. We now know we can do 5781 – 1832 to find our missing number.   **Column subtraction for up to two 4-digit number, with 1 or more exchange** Use of (compact) column subtraction with up to two 4-digit numbers (may also do 4 digit number – 3 digit number etc). May have no exchanging, one exchange or multiple exchanging. One exchange $\begin{array}{r} {}^{6\ 1} \\ 5749 \\ -\ 3471 \\ \hline 2278 \end{array}$ Starting with the ones, subtract each column in turn. When subtracting 4 tens -7 tens, exchange 1 hundred to make: 14 tens – 7 tens = 7 tens Multiple exchanges $\begin{array}{r} {}^{6\ 13\ 1} \\ 5742 \\ -\ 3476 \\ \hline 2266 \end{array}$ Starting with the ones, subtract each column in turn. Exchange tens, hundreds and/ or thousands as required. NB: Emphasis to be made on the place value of each digit and when introduced in Y4 (already done version of this in Y2 and Y3) to the method children should be shown it with counters and place value grid on the IWB to model exchanging. If need practical apparatus - use Numicon or Base 10 to model the exchanging.

Y4 – continued	(See above)	(See above)	**Column Subtraction** **Column subtraction for decimals** Use of (compact) column subtraction for numbers with the same amount of decimal places **For example**: when solving subtraction problem with a money context that goes into the decimal system with tenths and hundredths. For two amounts with same number of decimal places:  For two amounts with same number of decimal places and require exchanging: 

Y4 x	**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; multiplying together 3 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** **Solve problems involving multiplying and adding, including using the distributive law to multiply two-digit numbers by 1 digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects**	(not necessarily in this order) Learn shortcuts for mental multiplication **For example:** • to x4 you x2 and x2 again • to x5 you x10 and divide by 2 • to x20 you x2 and x10 Use known multiplication facts to mentally solve other multiplications **For example:** if you know 8x3=24 you know… • 8x30=240 • 80x3=240 • 80x30=2400 Multiplication is commutative Factor pairs of numbers Fact families – using known fact to find the others **For example:** if you know 9x4=36 then you know 4x9=36 and 36÷9=4 and 36÷4=9 Multiplying by 1 Know that any number x by 1 = itself **For example: 81 x 1 = 81** Multiplying by 0 Know that any number x by 0= 0 **For example: 72 x 0 = 0** Multiplying 3 numbers together and shortcuts to take **For example:** 8 x 7 x 2 First solve 8 x 7 = 56 (as it's the trickier one) Then 56 x 2 = 112 (as doubling is easier)	**Multiplying a number by 10 and 100** Use of place value grids Moving 1 place to the left for x10 or 2 places to the left for x100 or 3 places to the left for x1000 NB: Start with counters then write digits in.  Once children understand the place value reasons behind this they can use shortcuts of putting zeros onto the end (making it more of a mental calculation) **For example**: 78 x 10. Multiplying by 10 → 10 has 1 zero so I need to put 1 zero on the end of my number → 780 **For example**: 6 x 100. Multiplying by 100 → 100 has 2 zeroes so I need to put 2 zeroes on the end of my numbers → 600 **For example**: 52 x 100. Multiplying by 100 → 100 has 2 zeroes so I need to put 2 zeroes on the end of my numbers → 5200 **Children to learn both of the following methods and choose what they prefer to use (guided towards choosing column method.)** NB: If children struggled, can use either of these methods with counters & PV grid. **Using grid method for multiplication**  Multiplying 2 and 3 digit numbers x 1 digit numbers using grid method. • First – partition the number into its (hundreds,) tens and ones. • Draw grid and set out partitioned numbers into the grid. • Multiply each partitioned number along the top by the 1 digit number, fill in the answer • Line up all the parts of the answer and complete a column addition • Now you have the final answer **Using column method for multiplication**  Multiplying 2 and 3 digit numbers x 1 digit numbers using column multiplication method • First set out the numbers in a column method ensuring HTO are accurately lined up • Start by multiplying the ones by the x number • Record the answer under the line in the correct column • Work through the tens and then hundreds. • If the digits are larger than 9 they need to be regrouping into the next place value column as the children are familiar in doing with column addition.

Y4 **÷**	**(Multiplication & Division)** **Recall division facts for multiplication tables up to 12 × 12** **Use place value, known and derived facts to divide mentally, including dividing by 1** **Recognise and use factor pairs and commutativity in mental calculations** **(Fractions & Decimals)** **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**	Use their multiplication knowledge to divide mentally. **Eg. 8 x 9 = 72 so 72 ÷ 8 = 9** Use inverse of factors and factor pairs. **Eg. Know that factors of 36 are 1 and 36, 2 and 18, 3 and 12, 4 and 9, and 6. Therefore we know that 36 ÷ 3 = 12.** Know that division is not commutative. Fact families – using known fact to find the others **Eg. if you know 9x4=36 then you know 4x9=36 and 36÷9=4 and 36÷4=9** Know that any number ÷ by 1 = itself **Eg. 81 ÷ 1 = 81**	Use of place value grids Moving 1 place to the right for ÷10 or 2 places to the right for ÷100 NB: Start with counters then write digits in. ***Dividing a number by 10 and 100*** Th Thousands / H Hundreds / T Tens / U Units 1 0 0 1 0 — ÷ 10 1 — ÷ 100 ***Bus stop Division*** Bus stop division for 2 or 3 digit numbers divided by 1 digit number (no remainders) Start with numbers that fully divide (no regrouping required) - with 2 digit 2 1 4 8 4 or 3 digit 3 1 2 3 9 3 6 Then move onto some regrouping across - with 2 digit 1 5 3 4 ¹5 or 3 digit & one regroup 2 1 4 4 8 5 ¹6 or 3 digit & one regroup 0 4 5 8 3 ³6 ⁴0