MOORSIDE

Moorside Infant and Junior Schools

MATHEMATICS POLICY 2016

The National Curriculum states that:

'Teachers should use every relevant subject to develop pupils' mathematical fluency.'

(The National Curriculum 2013)

The underlying aim of all our mathematics work across the curriculum, is to equip children with numeracy skills and knowledge which will enable them to cope confidently throughout life. Our maths lessons deliver challenge for all.

Common features of mastery include:

- An expectation that all children can succeed in maths, often achieved by keeping the class together
- Giving children a secure and sustainable understanding of mathematical concepts by developing consistent models and images throughout
- Ensuring children are fluent in mathematical procedures and number facts by rehearsing these in systematic ways.
- Children who master a concept easily are expected to deepen their understanding, for example by applying it to solve problems embedded in mathematical investigations or more complex contexts
- Children who do not master an objective with the rest of the class should be supported to enable them to gain more experience and achieve mastery, for example through same-day intervention (catch up boxes), plus longer-term help if necessary

We provide:

- Experiences which promote a positive and independent attitude to learning, using and applying mathematics.
- Opportunities which develop clear and logical thinking.
- A variety of learning experiences using concrete, pictoral and abstract resources using mathematical vocabulary throughout lessons.
- A range of open and closed tasks, both short and extended, which use and apply mathematical skills. This includes problem solving opportunities which develop flexible thinking, use of arithmetic fluently, and an ability to accept innovation.
- A lively approach to the subject which promotes enjoyment and competition using mental, practical and physical activities (including games) where appropriate.
- Opportunities for pupils' to apply numeracy and mathematical reasoning in all subjects across the curriculum, so that they understand and appreciate the importance of mathematics.

Planning:
Teachers use the NYCC spider diagrams alongside the National Curriculum and the White Rose Maths Hub long term plan as a starting point for assessment for learning and planning. This is enhanced by a wealth of support materials; Abacus (Pearson), NRich problem solving tasks and the NCETM progression in reasoning documentation. The Haylock and Cockburn CPA model is used for planning and within the learning environment to ensure that children make links between language, concrete, pictoral and abstract representations for deeper understanding.
The **EYFS** use the North Yorkshire 'Becoming a Mathematician; and the 'White Rose Scheme of Learning' to support planning for numeracy provision, with activities appropriate to the level of learning. The weekly planning outlines the topic/theme with the relevant maths statements taken from the EYFS curriculum. The current topic in maths is reflected in the continuous and enhanced provision. Children in the EYFS have a daily maths input where they are introduced to appropriate focused activities, which are built on throughout the year, to prepare children for KS1.

Teaching and Learning KS1 and KS2:
Maths lessons should be carried out daily so that learning is consistent but the structure is flexible, depending on progression within a topic. Lesson structure is not prescriptive as some numeracy lessons benefit from a more varied style, for example, when taking maths outside or a creative approach through topic linked lessons. Lessons should include time for pupils to work as a whole class, in groups, in pairs or as individuals to tackle challenging questions, practice calculations, solve problems which involve reasoning, or investigate an area of maths. This does not need to be confined to the daily maths lessons as teachers will 'develop pupils' numeracy and mathematical reasoning in all subjects.' (NC 2013)
During a maths lesson, each child or group should receive some teaching input which incorporates the use of concrete, pictoral and abstract representations. During this time, children should be encouraged to put mental arithmatic into practice, with opportunities for them to progress and explain their methods.

Anchor tasks
An anchor task is a challenging problem given to pupils at the beginning of a maths lesson/when introducing a new concept. It should facilitate an opportunity for pupils to demonstrate/activate prior knowledge. An anchor task may require pupils to collaborate and ask questions of each other, and promote an environment for them to productively struggle and persevere in problem solving and therefore provide a purpose for learning. While pupils are collaborating, the teacher may pose questions to guide thinking. At the conclusion of the task, pupils may or may not arrive at the anticipated answer which helps the teacher determine the starting point for direct instruction or identifies misconceptions and gaps in prior learning. Through teacher instruction, children are encouraged to try various strategies and methods using concrete, pictorial, or abstract models, to deepen their learning and understanding of a concept.

Assessment

Formative:	Informal assessment is ongoing and informs daily planning. Referral to 'I Can' statements on the Spider Diagrams assesses progress and involves the children in understanding their own next steps. Weekly times tables tests and monitoring of abacus tasks.

Formative/
Summative: PUMA maths assessments are carried out to review children's progress in relation to target tracker 'APP statements'. They enable teachers to track both whole class and individual progress to identify gaps and inform the next steps in their teaching. Both assessment methods enable teachers to identify whether children are beginning, working within or securing end of year age related expectations. In addition, children also have **non-negotiables** (roughly 10 statements) to outline EOY expectations for each year group (see Appendix 3). These are shared with pupils in their books and updated by teachers half termly, so that they can target specific areas of learning through whole-class teaching or catch up/keep up sessions.

Summative: End of year assessments will be carried out towards the end of each school year through GL assessments, PUMA maths and SATS (Y2 and 6) tests to obtain standardised scores.

SEN

Where appropriate, group work will be modified to cater for children with SEN, although children will, wherever possible, be integrated with the whole class for class teaching through scaffolded questioning and the use of concrete and pictoral resources and representations to support understanding. Extra adult support may be used to assist children with identified learning difficulties.

Catch up/Keep up boxes

Children are encouraged to self-assess their progress in lessons using red, amber and green boxes where they deliver their books at the end of a lesson. Teacher's formative assessments and pupil's self-assessment will identify children who need additional modelling (delivered by the teacher or teaching assistant soon after the maths lesson) and practice to keep up with the cohort and close the gap.

Homework

Online Abacus interactive homework challenges and activities. This resource is updated for each pupil regularly by teachers, so that they can practice their target areas to improve mental maths. A whole-class rewards system encourages children to access this high quality online resource.

Learning Environment:

The Haylock and Cockburn Connections Model is displayed on learning walls and display concrete, pictoral, abstract images and language in line with current learning. Children are encouraged to be independent learners as they have access to concrete resources throughout lessons and use additional support prompts both on the wall and in helping hands booklets. Maths areas/resources are organised and accessible. Numbers, times tables and calculation methods are age-appropriate and visible to all children.

Our Moorside policy is summarised in our **Maths TOP FIVE Non-negotiables:**

Every Child Must:

- Be taught mental maths (arithmetic) daily.
- Have maths modelled to them which incorporates the use of equipment, symbols and pictorial representation.
- Be given a range of problems and challenges; logic, word, finding all possibilities, finding patterns, rules or spacial. These are incorporated into lessons through anchor tasks, to create a purpose for learning or to use and apply skills.
- Experience rich and sophisticated mastery problems, as soon as they have grasped concepts
- Apply their mathematical knowledge and skills to science and other curriculum subjects.

Appendix one: Progression in Calculations document Y1-6
Appendix two: Long term plan
Appendix three: Maths non negotiables

CR October 2016

Appendix one

KEY STAGE 1

Children in Years 1 and 2 will be given a really solid foundation in the basic building blocks of mental and written arithmetic. Through being taught place value, children will develop an understanding of how numbers work, so that they are confident with 2-digit numbers and beginning to read and say numbers above 100.

Addition and Subtraction: A focus on number bonds, first via practical hands-on experiences and subsequently using memorisation techniques, enables a good grounding in these crucial facts, and ensures that all children leave Year 2 knowing the pairs of numbers which make all the numbers up to 10 at least. Children will also have experienced and been taught pairs to 20. Children's knowledge of number facts enables them to add several 1-digit numbers, and to add/subtract a 1-digit number to/from a 2-digit number. Another important conceptual tool is the ability to add/subtract 1 or 10, and to understand which digit changes and why. This understanding is extended to enable children to add and subtract multiples of 10 to and from any 2-digit number. The most important application of this knowledge is the ability to add or subtract any pair of 2-digit numbers by counting on or back in 10s and 1s. Children may extend this to adding by partitioning numbers into 10s and 1s.	**Multiplication and Division:** Children will be taught to count in 2s, 3s, 5s and 10s, and will relate this skill to repeated addition. Children will meet and begin to learn the associated ×2, ×3, ×5 and ×10 tables. Engaging in a practical way with the concept of repeated addition and the use of arrays enables children to develop a preliminary understanding of multiplication, and asking them to consider how many groups of a given number make a total will introduce them to the idea of division. Children will also be taught to double and halve numbers, and will thus experience scaling up or down as a further aspect of multiplication and division.	**Fractions:** Fractions will be introduced as numbers and as operators, specifically in relation to halves, quarters and thirds.

Year 1

	Mental calculation	Written calculation	Default for ALL children
Y 1 +	Number bonds ('story' of 5, 6, 7, 8, 9 and 10) Count on in 1s from a given 2-digit number Add two 1-digit numbers Add three 1-digit numbers, spotting doubles or pairs to 10 Count on in 10s from any given 2-digit number Add 10 to any given 2-digit number Use number facts to add 1-digit numbers to 2-digit numbers e.g. *Use 4 + 3 to work out 24 + 3, 34 + 3* Add by putting the larger number first		Pairs with a total of 10 Count in 1s Count in 10s Count on 1 from any given 2-digit number

Y 1 –	Number bonds ('story' of 5, 6, 7, 8, 9 and 10) Count back in 1s from a given 2-digit number Subtract one 1-digit number from another Count back in 10s from any given 2-digit number Subtract 10 from any given 2-digit number Use number facts to subtract 1-digit numbers from 2-digit numbers e.g. *Use 7 – 2 to work out 27 – 2, 37 – 2*		Pairs with a total of 10 Count back in 1s from 20 to 0 Count back in 10s from 100 to 0 Count back 1 from any given 2-digit number
Y 1 ×	Begin to count in 2s, 5s and 10s Begin to say what three 5s are by counting in 5s, or what four 2s are by counting in 2s, etc. Double numbers to 10		Begin to count in 2s and 10s Double numbers to 5 using fingers
Y 1 ÷	Begin to count in 2s, 5s and 10s Find half of even numbers to 12 and know it is hard to halve odd numbers Find half of even numbers by sharing Begin to use visual and concrete arrays or 'sets of' to find how many sets of a small number make a larger number		Begin to count in 2s and 10s Find half of even numbers by sharing
Year 2			
	Mental calculation	**Written calculation**	**Default for ALL children**
Y 2 +	Number bonds – know all the pairs of numbers which make all the numbers to 12, and pairs with a total of 20 Count on in 1s and 10s from any given 2-digit number Add two or three 1-digit numbers Add a 1-digit number to any 2-digit number using number facts, including bridging multiples of 10 e.g. *45 + 4* e.g. *38 + 7* Add 10 and small multiples of 10 to any given 2-digit number Add any pair of 2-digit numbers		Know pairs of numbers which make each total up to 10 Add two 1-digit numbers Add a 1-digit number to a 2-digit number by counting on in 1s Add 10 and small multiples of 10 to a 2-digit number by counting on in 10s

Y 2 –	Number bonds – know all the pairs of numbers which make all the numbers to 12 Count back in 1s and 10s from any given 2-digit number Subtract a 1-digit number from any 2-digit number using number facts, including bridging multiples of 10 e.g. *56 – 3* e.g. *53 – 5* Subtract 10 and small multiples of 10 from any given 2-digit number Subtract any pair of 2-digit numbers by counting back in 10s and 1s or by counting up		Know pairs of numbers which make each total up to 10 Subtract a 1-digit number from a 2-digit number by counting back in 1s Subtract 10 and small multiples of 10 from a 2-digit number by counting back in 10s
Y 2 ×	Count in 2s, 5s and 10s Begin to count in 3s Begin to understand that multiplication is repeated addition and to use arrays e.g. *3 × 4 is three rows of 4 dots* Begin to learn the ×2, ×3, ×5 and ×10 tables, seeing these as 'lots of' e.g. *5 lots of 2, 6 lots of 2, 7 lots of 2* Double numbers up to 20 Begin to double multiples of 5 to 100 Begin to double 2-digit numbers less than 50 with 1s digits of 1, 2, 3, 4 or 5		Count in 2s, 5s and 10s Begin to use and understand simple arrays e.g. *2 × 4 is two lots of four* Double numbers up to 10 Double multiples of 10 to 50
Y 2 ÷	Count in 2s, 5s and 10s Begin to count in 3s Using fingers, say where a given number is in the 2s, 5s or 10s count e.g. *8 is the fourth number when I count in 2s* Relate division to grouping e.g. *How many groups of 5 in 15?* Halve numbers to 20 Begin to halve numbers to 40 and multiples of 10 to 100		Count in 2s, 5s and 10s Say how many rows in a given array e.g. *How many rows of 5 are in an array of 3 × 5?* Halve numbers to 12 Find $^1/_2$ of amounts

	Find $^{1}/_{2}$, $^{1}/_{3}$, $^{1}/_{4}$ and $^{3}/_{4}$ of a quantity of objects and of amounts (whole number answers)		

LOWER KEY STAGE 2

In Lower Key Stage 2, children build on the concrete and conceptual understandings they have gained in Key Stage 1 to develop a real mathematical understanding of the four operations, in particular developing arithmetical competence in relation to larger 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 discard 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, 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.	**Multiplication and division:** This key stage is also the period during which all the multiplication and division facts are thoroughly memorised, including all facts up to 12 × 12. Efficient written methods for multiplying or dividing a 2-digit or 3-digit number by a 1-digit number are taught, as are mental strategies for multiplication or division with large but 'friendly' numbers, e.g. when dividing by 5 or multiplying by 20.	**Fractions and decimals:** Children will develop their understanding of fractions, learning to reduce a fraction to its simplest form, as well as finding non-unit fractions of amounts and quantities. The concept of a decimal number is introduced and children consolidate a firm understanding of 1-place decimals, multiplying and dividing whole numbers by 10 and 100.

Year 3

	Mental calculation	Written calculation	Default for ALL children
Y 3 +	Know pairs with each total to 20 e.g. *2 + 6 = 8, 12 + 6 = 18, 7 + 8 = 15* Know pairs of multiples of 10 with a total of 100 Add any two 2-digit numbers by counting on in 10s and 1s or by using partitioning Add multiples and near multiples of 10 and 100 Perform place-value additions without a struggle e.g. *300 + 8 + 50 = 358* Use place value and number facts to add a 1-digit or 2-digit number to a 3-digit number e.g. *104 + 56 is 160 since 104 + 50 =*	Use expanded column addition to add two or three 3-digit numbers or three 2-digit numbers Begin to use compact column addition to add numbers with 3 digits Begin to add like fractions e.g. $^3/_8 + {}^1/_8 + {}^1/_8$ Recognise fractions that add to 1 e.g. $^1/_4 + {}^3/_4$ e.g. $^3/_5 + {}^2/_5$	Know pairs of numbers which make each total up to 10, and which total 20 Add two 2-digit numbers by counting on in 10s and 1s e.g. *56 + 35 is 56 + 30 and then add the 5* Understand simple place-value additions e.g. *200 + 40 + 5 = 245* Use place value to add multiples of 10 or 100

	154 and 6 + 4 = 10 *676 + 8 is 684 since 8 = 4 + 4 and 76 + 4 + 4 = 84* Add pairs of 'friendly' 3-digit numbers e.g. *320 + 450* Begin to add amounts of money using partitioning		
Y 3 –	Know pairs with each total to 20 e.g. *8 – 2 = 6* e.g. *18 – 6 = 12* e.g. *15 – 8 = 7* Subtract any two 2-digit numbers Perform place-value subtractions without a struggle e.g. *536 – 30 = 506* Subtract 2-digit numbers from numbers > 100 by counting up e.g. *143 – 76 is done by starting at 76. Then add 4 (80), then add 20 (100), then add 43, making the difference a total of 67* Subtract multiples and near multiples of 10 and 100 Subtract, when appropriate, by counting back or taking away, using place value and number facts Find change from £1, £5 and £10	Use counting up as an informal written strategy for subtracting pairs of 3-digit numbers e.g. *423 – 357* Begin to subtract like fractions e.g. $^{7}/_{8} - {}^{3}/_{8}$	Know pairs of numbers which make each total up to 10, and which total 20 Count up to subtract 2-digit numbers e.g. *72 – 47* Subtract multiples of 5 from 100 by counting up e.g. *100 – 35* Subtract multiples of 10 and 100
Y 3 ×	Know by heart all the multiplication facts in the ×2, ×3, ×4, ×5, ×8 and ×10 tables Multiply whole numbers by 10 and 100 Recognise that multiplication is commutative Use place value and number facts in mental multiplication e.g. *30 × 5 is 15 × 10* Partition teen numbers to multiply by a 1-	Use partitioning (grid multiplication) to multiply 2-digit and 3-digit numbers by 'friendly' 1-digit numbers	Know by heart the ×2, ×3, ×5 and ×10 tables Double given tables facts to get others Double numbers up to 25 and multiples of 5 to 50

	digit number e.g. *3 × 14 as 3 × 10 and 3 × 4* Double numbers up to 50		
Y 3 ÷	Know by heart all the division facts derived from the ×2, ×3, ×4, ×5, ×8 and ×10 tables Divide whole numbers by 10 or 100 to give whole number answers Recognise that division is not commutative Use place value and number facts in mental division e.g. *84 ÷ 4 is half of 42* Divide larger numbers mentally by subtracting the 10th multiple as appropriate, including those with remainders e.g. *57 ÷ 3 is 10 + 9 as 10 × 3 = 30 and 9 × 3 = 27* Halve even numbers to 100, halve odd numbers to 20	Perform divisions just above the 10th multiple using horizontal or vertical jottings and understanding how to give a remainder as a whole number Find unit fractions of quantities and begin to find non-unit fractions of quantities	Know by heart the division facts derived from the ×2, ×3, ×5 and ×10 tables Halve even numbers up to 50 and multiples of 10 to 100 Perform divisions within the tables including those with remainders e.g. *38 ÷ 5*
Year 4			
	Mental calculation	**Written calculation**	**Default for ALL children**
Y 4 +	Add any two 2-digit numbers by partitioning or counting on Know by heart/quickly derive number bonds to 100 and to £1 Add to the next 100, £1 and whole number e.g. *234 + 66 = 300* e.g. *3·4 + 0·6 = 4* Perform place-value additions without a struggle e.g. *300 + 8 + 50 + 4000 = 4358* Add multiples and near multiples of 10, 100 and 1000 Add £1, 10p, 1p to amounts of money Use place value and number facts to add 1-, 2-, 3- and 4-digit numbers where a mental	Column addition for 3-digit and 4-digit numbers e.g. 5347 2286 +1495 121 9128 Add like fractions e.g. $\frac{3}{5} + \frac{4}{5} = \frac{7}{5} = 1\frac{2}{5}$ Be confident with fractions that add to 1 and fraction complements to 1 e.g. $\frac{2}{3} + \_ = 1$	Add any 2-digit numbers by partitioning or counting on Number bonds to 20 Know pairs of multiples of 10 with a total of 100 Add 'friendly' larger numbers using knowledge of place value and number facts Use expanded column addition to add 3-digit numbers

	calculation is appropriate e.g. *4004 + 156 by knowing that 6 + 4 = 10 and that 4004 + 150 = 4154 so the total is 4160*		
Y 4 –	Subtract any two 2-digit numbers Know by heart/quickly derive number bonds to 100 Perform place-value subtractions without a struggle e.g. *4736 – 706 = 4030* Subtract multiples and near multiples of 10, 100, 1000, £1 and 10p Subtract multiples of 0·1 Subtract by counting up e.g. *503 – 368 is done by adding 368 + 2 + 30 + 100 + 3 (so we added 135)* Subtract, when appropriate, by counting back or taking away, using place value and number facts Subtract £1, 10p, 1p from amounts of money Find change from £10, £20 and £50	Use expanded column subtraction for 3- and 4-digit numbers Use complementary addition to subtract amounts of money, and for subtractions where the larger number is a near multiple of 1000 or 100 e.g. *2002 – 1865* Subtract like fractions e.g. $^4/_5 - {}^3/_5 = {}^1/_5$ Use fractions that add to 1 to find fraction complements to 1 e.g. $1 - {}^2/_3 = {}^1/_3$	Use counting up with confidence to solve most subtractions, including finding complements to multiples of 100 e.g. *512 – 287* e.g. *67 + _ = 100*
Y 4 ×	Know by heart all the multiplication facts up to 12 × 12 Recognise factors up to 12 of 2-digit numbers Multiply whole numbers and 1-place decimals by 10, 100, 1000 Multiply multiples of 10, 100 and 1000 by 1-digit numbers e.g. *300 × 6* e.g. *4000 × 8* Use understanding of place value and number facts in mental multiplication e.g. *36 × 5 is half of 36 × 10*	Use a vertical written method to multiply a 1-digit number by a 3-digit number (ladder method) Use an efficient written method to multiply a 2-digit number by a number between 10 and 20 by partitioning (grid method)	Know by heart multiplication tables up to 10 × 10 Multiply whole numbers by 10 and 100 Use the grid method to multiply a 2-digit or a 3-digit number by a number ≤ 6

	e.g. *50 × 60 = 3000* Partition 2-digit numbers to multiply by a 1-digit number mentally e.g. *4 × 24 as 4 × 20 and 4 × 4* Multiply near multiples by rounding e.g. *33 × 19 as (33 × 20) – 33* Find doubles to double 100 and beyond using partitioning Begin to double amounts of money e.g. *£35·60 doubled is £71·20*		
Y 4 ÷	Know by heart all the division facts up to 144 ÷ 12 Divide whole numbers by 10, 100, to give whole number answers or answers with 1 decimal place Divide multiples of 100 by 1-digit numbers using division facts e.g. *3200 ÷ 8 = 400* Use place value and number facts in mental division e.g. *245 ÷ 20 is half of 245 ÷ 10* Divide larger numbers mentally by subtracting the 10th or 20th multiple as appropriate e.g. *156 ÷ 6 is 20 + 6 as 20 × 6 = 120 and* *6 × 6 = 36* Find halves of even numbers to 200 and beyond using partitioning Begin to halve amounts of money e.g. *half of £52·40 is £26·20*	Use a written method to divide a 2-digit or a 3-digit number by a 1-digit number Give remainders as whole numbers Begin to reduce fractions to their simplest forms Find unit and non-unit fractions of larger amounts	Know by heart all the division facts up to 100 ÷ 10 Divide whole numbers by 10 and 100 to give whole number answers or answers with 1 decimal place Perform divisions just above the 10th multiple using the written layout and understanding how to give a remainder as a whole number Find unit fractions of amounts

UPPER KEY STAGE 2

Children move on from dealing mainly with whole numbers to performing arithmetic operations with both decimals and fractions.

Addition and subtraction: Children will consolidate their use of written procedures in adding and subtracting whole numbers with up to 6 digits and also decimal numbers with up to 2 decimal places. Mental strategies for adding and subtracting increasingly large numbers will also be taught. These will draw upon children's robust understanding of place value and knowledge of number facts. Negative numbers will be added and subtracted.	**Multiplication and division:** Efficient and flexible strategies for mental multiplication and division are taught and practised, so that children can perform appropriate calculations even when the numbers are large, such as *40 000 × 6* or *40 000 ÷ 8*. In addition, it is in Years 5 and 6 that children extend their knowledge and confidence in using written algorithms for multiplication and division.	**Fractions, decimals, percentages and ratio:** Fractions and decimals are also added, subtracted, divided and multiplied, within the bounds of children's understanding of these more complicated numbers. Children will also calculate simple percentages and ratios.

Year 5

	Mental calculation	Written calculation	Default for ALL children
Y 5 +	Know number bonds to 1 and to the next whole number Add to the next 10 from a decimal number e.g. *13·6 + 6·4 = 20* Add numbers with 2 significant digits only, using mental strategies e.g. *3·4 + 4·8* e.g. *23 000 + 47 000* Add 1- or 2-digit multiples of 10, 100, 1000, 10 000 and 100 000 e.g. *8000 + 7000* e.g. *600 000 + 700 000*	Use column addition to add two or three whole numbers with up to 5 digits Use column addition to add any pair of 2-place decimal numbers, including amounts of money Begin to add related fractions using equivalences e.g. $\frac{1}{2} + \frac{1}{6} = \frac{3}{6} + \frac{1}{6}$ Choose the most efficient method in any given situation	Add numbers with only 2 digits which are not zeros e.g. *3·4 + 5·8* Derive swiftly and without any difficulty number bonds to 100 Add 'friendly' large numbers using knowledge of place value and number facts Use expanded column addition to add pairs of 4- and 5-digit numbers

	Add near multiples of 10, 100, 1000, 10 000 and 100 000 to other numbers e.g. *82 472 + 30 004* Add decimal numbers which are near multiples of 1 or 10, including money e.g. *6·34 + 1·99* e.g. *£34·59 + £19·95* Use place value and number facts to add two or more 'friendly' numbers, including money and decimals e.g. *3 + 8 + 6 + 4 + 7* e.g. *0·6 + 0·7 + 0·4* e.g. *2056 + 44*		
Y 5 –	Subtract numbers with 2 significant digits only, using mental strategies e.g. *6·2 – 4·5* e.g. *72 000 – 47 000* Subtract 1- or 2-digit multiples of 10, 100, 1000, 10 000 and 100 000 e.g. *8000 – 3000* e.g. *60 000 – 200 000* Subtract 1- or 2-digit near multiples of 10, 100, 1000, 10 000 and 100 000 from other numbers e.g. *82 472 – 30 004* Subtract decimal numbers which are near multiples of 1 or 10, including money e.g. *6·34 – 1·99* e.g. *£34·59 – £19·95* Use counting up subtraction, with knowledge of number bonds to 10, 100 or £1, as a strategy to perform mental subtraction e.g. *£10 – £3·45* e.g. *1000 – 782* Recognise fraction complements to 1 and to the next whole number	Use compact or expanded column subtraction to subtract numbers with up to 5 digits Use complementary addition for subtractions where the larger number is a multiple or near multiple of 1000 Use complementary addition for subtractions of decimal numbers with up to 2 places, including amounts of money Begin to subtract related fractions using equivalences e.g. $^1/_2 - {}^1/_6 = {}^2/_6$ Choose the most efficient method in any given situation	Derive swiftly and without difficulty number bonds to 100 Use counting up with confidence to solve most subtractions, including finding complements to multiples of 1000 e.g. *3000 – 2387*

	e.g. *1 $^{2}/_{5}$ + $^{3}/_{5}$ = 2*		
Y 5 ×	Know by heart all the multiplication facts up to 12 × 12 Multiply whole numbers and 1- and 2-place decimals by 10, 100, 1000, 10 000 Use knowledge of factors and multiples in multiplication e.g. *43 × 6 is double 43 × 3* e.g. *28 × 50 is $^{1}/_{2}$ of 28 × 100 = 1400* Use knowledge of place value and rounding in mental multiplication e.g. *67 × 199 as 67 × 200 – 67* Use doubling and halving as a strategy in mental multiplication e.g. *58 × 5 is half of 58 × 10* e.g. *34 × 4 is 34 doubled twice* Partition 2-digit numbers, including decimals, to multiply by a 1-digit number mentally e.g. *6 × 27 as 6 × 20 (120) plus 6 × 7 (42)* e.g. *6·3 × 7 as 6 × 7 (42) plus 0·3 × 7 (2·1)* Double amounts of money by partitioning e.g. *£37·45 doubled is £37 doubled (£74) plus 45p doubled (90p) giving a total of £74·90*	Use short multiplication to multiply a 1-digit number by a number with up to 4 digits Use long multiplication to multiply 3-digit and 4-digit numbers by a number between 11 and 20 Choose the most efficient method in any given situation Find simple percentages of amounts e.g. *10%, 5%, 20%, 15% and 50%* Begin to multiply fractions and mixed numbers by whole numbers ≤ 10 e.g. *4 × $^{2}/_{3}$ = $^{8}/_{3}$ = 2 $^{2}/_{3}$*	Know multiplication tables to 11 × 11 Multiply whole numbers and 1-place decimals by 10, 100 and 1000 Use knowledge of factors as aids to mental multiplication e.g. *13 × 6 is double 13 × 3* e.g. *23 × 5 is $^{1}/_{2}$ of 23 × 10* Use the grid method to multiply numbers with up to 4 digits by 1-digit numbers Use the grid method to multiply 2-digit numbers by 2-digit numbers
Y 5 ÷	Know by heart all the division facts up to 144 ÷ 12 Divide whole numbers by 10, 100, 1000, 10 000 to give whole number answers or answers with 1, 2 or 3 decimal places Use doubling and halving as mental division strategies e.g. *34 ÷ 5 is (34 ÷ 10) × 2*	Use short division to divide a number with up to 4 digits by a number ≤ 12 Give remainders as whole numbers or as fractions Find non-unit fractions of large amounts Turn improper fractions into mixed numbers and vice versa Choose the most efficient method in any	Know by heart division facts up to 121 ÷ 11 Divide whole numbers by 10, 100 or 1000 to give answers with up to 1 decimal place Use doubling and halving as mental division strategies Use an efficient written method to divide numbers ≤ 1000 by 1-digit numbers Find unit fractions of 2- and 3-digit numbers

	Use knowledge of multiples and factors, as well as tests for divisibility, in mental division e.g. *246 ÷ 6 is 123 ÷ 3* e.g. *We know that 525 divides by 25 and by 3* Halve amounts of money by partitioning e.g. *½ of £75·40 = ½ of £75 (£37·50) plus half of 40p (20p) which is £37·70* Divide larger numbers mentally by subtracting the 10th or 100th multiple as appropriate e.g. *96 ÷ 6 is 10 + 6, as 10 × 6 = 60 and 6 × 6 = 36* e.g. *312 ÷ 3 is 100 + 4 as 100 × 3 = 300 and 4 × 3 = 12* Know tests for divisibility by 2, 3, 4, 5, 6, 9 and 25 Know square numbers and cube numbers Reduce fractions to their simplest form	given situation	
Year 6			
	Mental calculation	**Written calculation**	**Default for ALL children**
Y 6 +	Know by heart number bonds to 100 and use these to derive related facts e.g. *3·46 + 0·54* Derive, quickly and without difficulty, number bonds to 1000 Add small and large whole numbers where the use of place value or number facts makes the calculation do-able mentally e.g. *34 000 + 8000* Add multiples of powers of 10 and near multiples of the same e.g. *6345 + 199*	Use column addition to add numbers with up to 5 digits Use column addition to add decimal numbers with up to 3 decimal places Add mixed numbers and fractions with different denominators	Derive, swiftly and without difficulty, number bonds to 100 Use place value and number facts to add 'friendly' large or decimal numbers e.g. *3·4 + 6·6* e.g. *26 000 + 54 000* Use column addition to add numbers with up to 4-digits Use column addition to add pairs of 2-place decimal numbers

	Add negative numbers in a context such as temperature where the numbers make sense Add two 1-place decimal numbers or two 2-place decimal numbers less than 1 e.g. *4·5 + 6·3* e.g. *0·74 + 0·33* Add positive numbers to negative numbers e.g. *Calculate a rise in temperature or continue a sequence beginning with a negative number*		
Y 6 –	Use number bonds to 100 to perform mental subtraction of any pair of integers by complementary addition e.g. *1000 – 654 as 46 + 300 in our heads* Use number bonds to 1 and 10 to perform mental subtraction of any pair of 1-place or 2-place decimal numbers using complementary addition and including money e.g. *10 – 3·65 as 0·35 + 6* e.g. *£50 – £34·29 as 71p + £15* Use number facts and place value to perform mental subtraction of large numbers or decimal numbers with up to 2 places e.g. *467 900 – 3005* e.g. *4·63 – 1·02* Subtract multiples of powers of 10 and near multiples of the same Subtract negative numbers in a context such as temperature where the numbers make sense	Use column subtraction to subtract numbers with up to 6 digits Use complementary addition for subtractions where the larger number is a multiple or near multiple of 1000 or 10 000 Use complementary addition for subtractions of decimal numbers with up to 3 places, including money Subtract mixed numbers and fractions with different denominators	Use number bonds to 100 to perform mental subtraction of numbers up to 1000 by complementary addition e.g. *1000 – 654 as 46 + 300 in our heads* Use complementary addition for subtraction of integers up to 10 000 e.g. *2504 – 1878* Use complementary addition for subtractions of 1-place decimal numbers and amounts of money e.g. *£7·30 – £3·55*
Y 6 ×	Know by heart all the multiplication facts up to 12 × 12 Multiply whole numbers and decimals with up to	Use short multiplication to multiply a 1-digit number by a number with up to 4 digits Use long multiplication to multiply a 2-digit number by a number with up to 4 digits Use short multiplication to multiply a 1-digit	Know by heart all the multiplication facts up to 12 × 12 Multiply whole numbers and 1- and 2-place decimals by 10, 100 and 1000

	3 places by 10, 100 or 1000 e.g. *234 × 1000 = 234 000* e.g. *0·23 × 1000 = 230* Identify common factors, common multiples and prime numbers and use factors in mental multiplication e.g. *326 × 6 is 652 × 3 which is 1956* Use place value and number facts in mental multiplication e.g. *4000 × 6 = 24 000* e.g. *0·03 × 6 = 0·18* Use doubling and halving as mental multiplication strategies, including to multiply by 2, 4, 8, 5, 20, 50 and 25 e.g. *28 × 25 is a quarter of 28 × 100 = 700* Use rounding in mental multiplication e.g. *34 × 19 as (34 × 20) – 34* Multiply 1- and 2-place decimals by numbers up to and including 10 using place value and partitioning e.g. *3·6 × 4 is 12 + 2·4* e.g. *2·53 × 3 is 6 + 1·5 + 0·09* Double decimal numbers with up to 2 places using partitioning e.g. *36·73 doubled is double 36 (72) plus double 0·73 (1·46)*	number by a number with 1 or 2 decimal places, including amounts of money Multiply fractions and mixed numbers by whole numbers Multiply fractions by proper fractions Use percentages for comparison and calculate simple percentages	Use an efficient written method to multiply a 1-digit or a teen number by a number with up to 4 digits by partitioning (grid method) Multiply a 1-place decimal number up to 10 by a number ≤ 100 using the grid method
Y 6 ÷	Know by heart all the division facts up to 144 ÷ 12 Divide whole numbers by powers of 10 to give whole number answers or answers with up to 3 decimal places Identify common factors, common multiples and primes numbers and use factors in mental division	Use short division to divide a number with up to 4 digits by a 1-digit or a 2-digit number Use long division to divide 3-digit and 4-digit numbers by 'friendly' 2-digit numbers Give remainders as whole numbers or as fractions or as decimals Divide a 1-place or a 2-place decimal number by a number ≤ 12 using multiples of the	Know by heart all the division facts up to 144 ÷ 12 Divide whole numbers by 10, 100, 1000 to give whole number answers or answers with up to 2 decimal places Use an efficient written method, involving subtracting powers of 10 times the divisor, to divide any number of up to 1000 by a

	e.g. *438 ÷ 6 is 219 ÷ 3 which is 73* Use tests for divisibility to aid mental calculation Use doubling and halving as mental division strategies, for example to divide by 2, 4, 8, 5, 20 and 25 e.g. *628 ÷ 8 is halved three times: 314, 157, 78·5* Divide 1- and 2-place decimals by numbers up to and including 10 using place value e.g. *2·4 ÷ 6 = 0·4* e.g. *0·65 ÷ 5 = 0·13* e.g. *£6·33 ÷ 3 = £2·11* Halve decimal numbers with up to 2 places using partitioning e.g. *Half of 36·86 is half of 36 (18) plus half of 0·86 (0·43)* Know and use equivalence between simple fractions, decimals and percentages, including in different contexts Recognise a given ratio and reduce a given ratio to its lowest terms	divisors Divide proper fractions by whole numbers	number ≤ 12 e.g. *836 ÷ 11 as 836 – 770 (70 × 11) leaving 66 which is 6 × 11, giving the answer 76* Divide a 1-place decimal by a number ≤ 10 using place value and knowledge of division facts

Planning for Mastery - Maths Overview

	Autumn		Spring		Summer	
	First half	**Second half**	**First half**	**Second half**	**First half**	**Second half**
	Number and place value (suggested - 3 weeks) Addition and subtraction (suggested 3-4 weeks)	Multiplication and division (4 weeks) Measurement (3 weeks)	Fractions (suggested-4 weeks) Multiplication and Division (suggested-3 weeks)	Measurement (incl. time) (suggested-3 weeks) Geometry (suggested-3 weeks)	Consolidation of mental and written calculations (all 4 operations) (sugg. 3 weeks) Geometry- properties of shapes (2 weeks)	Fractions (3 weeks) Measurement (including time) (3 weeks)
	Problem solving (involving numbers) and reasoning –NCETM mastery questions and progression in reasoning documents.					
Spiders (To refer to outcomes broken down), learning journeys, linked to mental maths).	A1 and A2	C1 and C2 E1	D1 and D2 (C2 to consolidate and division)	B1 and B2 E2	A3, B3, C3	D3 and E3
Haylock and Cockburn connections model	**Language, Real-life context and concrete resources, pictures and images, symbols (abstract)-To use with learning wall and planning.**					
Assessment	Kent expectations	PUMA	Kent expectations	PUMA	Kent expectations	PUMA

Appendix 3:

MOORSIDE INFANT and JUNIOR SCHOOL

NON-NEGOTIABLES - MATHEMATICS

YEAR 1

Name / Class	Half Term					
Year 1 Non-Negotiables	1	2	3	4	5	6
Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number						
Read, write and order numbers to 100						
Say 1 more or less (0-30)						
Know by heart number bonds to 20						
Count on and back in 1's, 2's, 5's and 10's						
Double and halve numbers to at least 10						
Recognise, find and name a half and a quarter of an object or shape.						
Subtract a multiple of 10 from a two digit number						
Calculate: U+U (bridging 10)						
Calculate: TU+U (bridging 20)						
Calculate: U-U						
Calculate: TU-U (bridging 10)						

YEAR

Name	Half Term					
Class						
Year 2 Non-Negotiables	1	2	3	4	5	6
Compare and order numbers to 100.						
Count on and back in 1's and 10's from any number under 100						
Know by heart 2, 5 and 10 table facts and related division facts						
Recognise the place value of each digit in a two-digit number						
Know and use number bonds and families to 20						
Know all 10's number pairs to 100 (E.g. 30 + 70)						
Tell the time to half and quarter hour						
recognise, find, name and write fractions $\frac{1}{4}$, 1/3, 2/4, $\frac{3}{4}$, $\frac{1}{2}$ of a length, shape, set of objects or quantity						
Calculate: TU+TU (bridging 10/100)						
Calculate: TU-TU (bridging 10)						
Calculate: TU÷U (where the divisor is 2, 5 or 10)						

YEAR 3

Name	Half Term					
Class						
Year 3 Non-Negotiables	1	2	3	4	5	6
Read, write and order numbers and numerals to 1000						
Count on or back in 1's, 10's and 100's from any number less than 1000						
Mentally, add and subtract 1 and 2 digit numbers						
Know by heart 3 and 4 table facts and division facts						
Explain value of digits up to 1000						
Multiply 1 and 2 digit numbers by 10 and 1000						
Know number pairs that total 100 (and subtraction facts)						
Tell the time to the nearest 5 minutes						
Find simple fractions (1/3, 1/5 and 1/10) of shapes and amounts						
Add and subtract fractions with the same denominator within one whole						
Calculate: TU+TU (bridging 100)						
Calculate: HTU+TU/HTU (not bridging 1000)						
Calculate: TU-TU						
Calculate: HTU-TU/HTU						
Calculate: TUxU						
Calculate: TU÷U (where the divisor is 2,3,4,5,6 or 10)						

Name		Half Term					
Class							
Year 4 Non-Negotiables		1	2	3	4	5	6
Read, write and order numbers and numerals to 10,000							
Count in multiples of 6, 7, 9, 25 and 1000							
Mentally, add and subtract pairs of digit numbers							
Know by heart ALL table facts and division facts							
Explain the value of digits up to 10,000							
Multiply and divide 2 digit numbers by 10 and 100							
Divide numbers up to 1000 by 10 or 100							
Multiply and divide numbers up to 1000 by 2, 3, 4 or 5 and find the remainder							
Tell the time to the nearest minute							
Identify pairs of fractions that equal 1							
Calculate: (including in the context of real life e.g. money, measures etc)	HTU+TU						
	HTU+HTU (bridging 1000)						
	HTU-TU						
	HTU-HTU						
	TUxU						
	TU÷U						

YEAR 5

Name	Half Term

Class							
Year 5 Non-Negotiables		1	2	3	4	5	6
Read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit.							
Read, write and order numbers and numerals to 2dp							
Order a set of positive and negative integers							
Mentally, double all numbers to 100							
Use tables to derive other numbers facts							
Explain value of digits to 2dp							
Round decimal numbers to the nearest integer (1 and 2 dp)							
Add and subtract numbers to 10,000							
Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000							
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							
Calculate halves and doubles of decimals							
recognise and write decimal equivalents to 1/4 ,1/2 ,3/4							
Multiply and divide positive integers up to 10,000 by 10 and 100							
Calculate: (including in the context of real life e.g. money, measures etc)	ThHTU+HTU						
	ThHTU-HTU						
	HTUxU						
	TUxTU						
	U.txU						
	HTU÷U						

YEAR 6

Name		Half Term					
Class							
Year 6 Non-Negotiables		1	2	3	4	5	6
Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit							
Use negative numbers in context, and calculate intervals across zero							
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							
Multiply and divide decimals mentally by 10 and 100 and integers to 1000							
Use common factors to simplify fractions; use common multiples to express fractions in the same denomination							
Derive pairs of factors for numbers up to 100							
Calculate simple percentages of whole numbers							
Calculate: (including in the context of real life e.g. money, measures etc)	U.t ± U.t						
	TU/HTUxU						
	ThHTUxU						
	U.t x U						
	HTU/TU ÷ U						
	U.t÷U						