Wath Victoria Primary School

2021-2022

Maths @WV

Contents:

Reviewed September 2021.

Mathematics Policy

Wath Victoria

Reviewed September 2021.

Intent

We believe mathematics is an essential life skill. We seek to develop confident and competent children with an enthusiasm for mathematics, who can apply their knowledge and skills across the curriculum and in the outside world.

As part of this we aim to:

- to raise standards in mathematics using the teaching for mastery approach.
- to ensure that children have a range of calculation strategies and have independence in choosing the most efficient one when faced with a calculation.
- to give children competence and confidence with numbers and measures
- to develop children's understanding of the number system and its application to real life problems and cross curricular theme links.
- to acquire computational skills in order to solve number problems in a variety of contexts using different strategies and building on known facts
- to develop confidence in mathematics shown by an ability to express their ideas fluently using correct mathematical vocabulary

Implementation

Responsibilities:

Headteacher:

- set high expectations and monitor teaching and progress
- encourage a whole school approach, keeping parents, governors and all support staff well informed
- support and liaise with the coordinator and individual teachers when necessary
- review and monitor the mathematics action plan.
- include support staff in training where appropriate
- collect, collate and share all data with staff

Coordinators: Sciences Team

- lead by example showing a good understanding of the subject
- offer support to colleagues in planning, teaching and assessment
- work alongside the headteacher, monitoring and evaluating teaching and progress
- collect, collate and share all data with headteacher and staff.
- update audit and compile yearly action plan
- identify inset needs and coordinate the planning and delivery of inset
- keep up to date with current issues and initiatives and share with staff as necessary
- enrol staff in suitable CPD.

Teacher:

- have high expectations of learning, attainment and behaviour.
- Encourage and promote an enthusiasm and enjoyment for mathematics
- deliver the daily mathematics lesson sharing clear objectives with the children and support staff
- provide an appropriate level of challenge for all pupils in the lesson.
- use a range of teaching styles and strategies ensuring good pace and effective questioning
- provide opportunities for children to work as a whole class, in groups, in pairs and as individuals
- engage pupils in appropriate challenging, differentiated activities
- use the full range of resources available, including I.C.T.
- use the objectives and examples in new Framework to aid planning
- set homework in line with school policy
- encourage parents to develop and promote a positive attitude towards mathematics
- encourage parents to actively support their children's learning
- inform parents of their children's progress
- share ideas and concerns with colleagues
- lessons are taught around teaching concepts using the Teach, Practise, Apply, Evaluate model.
- use AFL during and after lessons to inform next steps.
- use of working wall whiteboards to support learning.
- provide discrete calculation practice to revisit concepts using the arithmetic scheme as a basis.
- ensure that children leave each year group fluent in the appropriate times tables for their age.
- Where appropriate, key stages may choose to group children across classes. The linked document underpins the thought processes that are undertaken with groupings. (https://www.ucl.ac.uk/ioe/sites/ioe/files/dos_and_donts_of_attainment_grouping_-_ucl_institute_of_education.pdf)

Senco:

- support the mathematics coordinator, teachers and support staff in providing for children with special educational needs
- encourage whole class inclusion
- ensure that children are challenged to an appropriate level.

Support Staff:

- attend staff training where possible
- support identified children towards becoming independent in learning.
- liaise with teacher to establish their role within each lesson
- discuss next steps with teachers and perform SDI with children if needed.
- Pre-teach children who may find concepts difficult.

Governors:

- to be well informed through the leadership of the headteacher , mathematics coordinator and Numeracy Governor
- to support staff in implementing the school's mathematics policy
- to review progress on the mathematics action plan

Impact

Children in the school will have a love of maths and will be able to calculate with efficiency at a stage that is appropriate for each child (see arithmetic policy). A high proportion of children will leave each year group at or above the year group expectation and those below will make progress appropriate to their level. Staff will produce exciting lessons using agreed strategies that use a depth of subject knowledge.

Wath Victoria Primary School Maths Curriculum. Year 1			
Place value	Calculation	Fractions/Decimals.	Shape/Space/Measure.
-Count to and across 100,forwards,backwards,from any number and recognise those numbers in numerals(numbers and place value names I.e 11/ten and one. -Count in 2s,5s and 10s. -Represent numbers as objects and on number lines. -Understand 'equal to', 'more than', 'less than', 'fewer', 'most' and 'least'. -read and write numbers from 1 to 20 in numerals and words.	-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 zero -solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = – 9. -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.	-recognise, find and name a half as one of two equal parts of an object, shape or quantity -recognise, find and name a quarter as one of four equal parts of an object, shape or quantity	-compare, describe and solve practical problems for: lengths and heights [for example, long/short, longer/shorter, tall/short, double/half] mass/weight [for example, heavy/light, heavier than, lighter than] capacity and volume [for example, full/empty, more than, less than, half, half full, quarter] time [for example, quicker, slower, earlier, later] -measure and begin to record the following: lengths and heights mass/weight capacity and volume time (hours, minutes, seconds) -recognise and know the value of different denominations of coins and notes -sequence events in chronological order using language [for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening] -recognise and use language relating to dates, including days of the week, weeks, months and years -tell the time to the hour and half past the hour and draw the hands on a clock face to show these times. -recognise and name common 2-D and 3-D shapes, including: 2-D shapes [for example, rectangles (including squares), circles and triangles] 3-D shapes [for example, cuboids (including cubes), pyramids and spheres]. -describe position, direction and movement, including whole, half, quarter and three quarter turns.

Wath Victoria Primary School Maths Curriculum. Year 2			
Place value	Calculation	Fractions/Decimals.	Shape/Space/Measure.
-count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward -recognise the place value of each digit in a two-digit number (tens, ones) -identify, represent and estimate numbers using different representations, including the number line -compare and order numbers from 0 up to 100; use and = signs -read and write numbers to at least 100 in numerals and in words -use place value and number facts to solve problems.	-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 ones a two-digit number and tens two two-digit numbers adding three one-digit numbers -show that addition of two numbers can be done in any order (commutative) and subtraction of one 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. -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. - recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value –find different combinations of coins that equal the same amounts of money - solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change -ask and answer questions about totalling and comparing categorical data	-Pupils should be taught to: recognise, find, name and write fractions 1/3 , ¼ , 2/4 and 3/4 of a length, shape, set of objects or quantity - write simple fractions for example, ½ of 6 = 3 and recognise the equivalence of 2/4 and 1/2 .	-Choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature (°C); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels -compare and order lengths, mass, volume/capacity and record the results using >, < and = -compare and sequence intervals of time - tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times – know the number of minutes in an hour and the number of hours in a day. -identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line -identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces - identify 2-D shapes on the surface of 3-D shapes, [for example, a circle on a cylinder and a triangle on a pyramid] -compare and sort common 2-D and 3-D shapes and everyday objects. order and arrange combinations of mathematical objects in patterns and sequences -use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anticlockwise). -interpret and construct simple pictograms, tally charts, block diagrams and simple tables –ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity

Wath Victoria Primary School Maths Curriculum. Year 3			
Place value	Calculation	Fractions/Decimals.	Shape/Space/Measure.
-count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number - recognise the place value of each digit in a three-digit number (hundreds, tens, ones) -compare and order numbers up to 1000 - identify, represent and estimate numbers using different representations - read and write numbers up to 1000 in numerals and in words - solve number problems and practical problems involving these ideas.	-add and subtract numbers mentally, including: a three-digit number and ones a three-digit number and tens a three-digit number and hundreds -add and subtract numbers with up to three 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. -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 -solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects. -interpret and present data using bar charts, pictograms and tables - solve one-step and two-step questions [for example, 'How many more?' and 'How many fewer?'] using information presented in scaled bar charts and pictograms and tables. -add and subtract amounts of money to give change, using both £ and p in practical contexts – measure the perimeter of simple 2-D shapes -measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml)	-count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10 -recognise, find and write fractions of a discrete set of objects: unit fractions and nonunit fractions with small denominators -recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators -recognise and show, using diagrams, equivalent fractions with small denominators -add and subtract fractions with the same denominator within one whole [for example, 7 5 + 7 1 = 7 6] -compare and order unit fractions, and fractions with the same denominators - solve problems that involve all of the above.	-tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks -estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight -know the number of seconds in a minute and the number of days in each month, year and leap year - compare durations of events [for example to calculate the time taken by particular events or tasks]. -draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them - recognise angles as a property of shape or a description of a turn - identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle – identify horizontal and vertical lines and pairs of perpendicular and parallel lines.

Wath Victoria Primary School Maths Curriculum. Year 4			
Place value	Calculation	Fractions/Decimals.	Shape/Space/Measure.
-count in multiples of 6, 7, 9, 25 and 1000 -find 1000 more or less than a given number -count backwards through zero to include negative numbers -recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones) -order and compare numbers beyond 1000 -identify, represent and estimate numbers using different representations -round any number to the nearest 10, 100 or 1000 -solve number and practical problems that involve all of the above and with increasingly large positive numbers -read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value. -round decimals with one decimal place to the nearest whole number -compare numbers with the same number of decimal places up to two decimal places -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	-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. -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 -solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects. -Convert between different units of measure (for example, kilometre to metre; hour to minute) -measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres -find the area of rectilinear shapes by counting squares -estimate, compare and calculate different measures, including money in pounds and pence -solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs. -interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs.	-recognise and show, using diagrams, families of common equivalent fractions -count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten. -solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number -add and subtract fractions with the same denominator -recognise and write decimal equivalents of any number of tenths or hundredths -recognise and write decimal equivalents to $\frac{1}{4}, \frac{1}{2}, \frac{3}{4}$ -solve simple measure and money problems involving fractions and decimals to two decimal places.	-compare and classify geometric shapes, including quadrilaterals and triangles**,** based on their properties and sizes -identify acute and obtuse angles and compare and order angles up to two right angles by size -identify lines of symmetry in 2-D shapes presented in different orientations -complete a simple symmetric figure with respect to a specific line of symmetry. -describe positions on a 2D grid as coordinates in the first quadrant -describe movements between positions as translations of a given unit to the left/right and up/down -plot specified points and draw sides to complete a given polygon.

Wath Victoria Primary School Maths Curriculum. Year 5			
Place value	Calculation	Fractions/Decimals.	Shape/Space/Measure.
-read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit -count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000 -interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero. -round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000 -solve number problems and practical problems that involve all of the above -read Roman numerals to 1000 (M) and recognise years written in Roman numerals. -round decimals with two decimal places to the nearest whole number and to one decimal place	-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. -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 -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. -solve problems involving number up to three decimal places -convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre) -measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres -calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm²) and square metres (m²) and estimate the area of irregular shapes. -complete, read and interpret information in tables, including timetables. -solve comparison, sum and difference problems using information presented in a line graph	-compare and order fractions whose denominators are all multiples of the same number -identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths -recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number [for example, $\frac{2}{5} + \frac{4}{5} = \frac{6}{5} = 1\frac{1}{5}$] -add and subtract fractions with the same denominator and denominators that are multiples of the same number -multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams -read and write decimal numbers as fractions [for example, 0·71 = $\frac{71}{100}$] -recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents -read, write, order and compare numbers with up to three decimal places -recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal -solve problems which require knowing percentage and decimal equivalents of $\frac{1}{2}, \frac{1}{4}, \frac{1}{5}, \frac{2}{5}, \frac{4}{5}$ and those fractions with a denominator of a multiple of 10 or 25.	-identify 3D shapes, including cubes and other cuboids, from 2D representations -know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles -draw given angles, and measure them in degrees (°) -identify: ○ angles at a point and one whole turn (total 360°) ○ angles at a point on a straight line and a turn (total 180°) ○ other multiples of 90° -use the properties of rectangles to deduce related facts and find missing lengths and angles -distinguish between regular and irregular polygons based on reasoning about equal sides and angles. -identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed. -understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints -estimate volume (for example, using 1 cm³ blocks to build cuboids, including cubes) and capacity (for example, using water) -solve problems involving converting between units of time -use all four operations to solve problems involving measure (for example, length, mass, volume, money) using decimal notation, including scaling.

Wath Victoria Primary School Maths Curriculum. Year 6			
Place value	Calculation	Fractions/Decimals.	Shape/Space/Measure.
-read, write, order and compare numbers up to 10 000 000 and determine the value of each digit -round any whole number to a required degree of accuracy -use negative numbers in context, and calculate intervals across zero -solve number and practical problems that involve all of the above. -identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places.	-multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication -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 -use their knowledge of the order of operations to carry out calculations involving the four operations -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. -use simple formulae -generate and describe linear number sequences -express missing number problems algebraically -find pairs of numbers that satisfy an equation with two unknowns -enumerate possibilities of combinations of two variables. -solve problems involving unequal sharing and grouping using knowledge of fractions and multiples. -convert between miles and kilometres -solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate -use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places -calculate and interpret the mean as an average.	-use common factors to simplify fractions; use common multiples to express fractions in the same denomination -compare and order fractions, including fractions > 1 -add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions -multiply simple pairs of proper fractions, writing the answer in its simplest form [for example, $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$] -divide proper fractions by whole numbers [for example, $\frac{1}{3} \div 2 = \frac{1}{6}$] -associate a fraction with division and calculate decimal fraction equivalents [for example, 0·375] for a simple fraction [for example , $\frac{3}{8}$] -multiply one-digit numbers with up to two decimal places by whole numbers -use written division methods in cases where the answer has up to two decimal places -solve problems which require answers to be rounded to specified degrees of accuracy -recall and use equivalences between simple fractions, decimals and percentages, including in different contexts. -solve problems involving the calculation of percentages (for example, of measures, and such as 15% of 360) and the use of percentages for comparison	-draw 2D shapes using given dimensions and angles -recognise, describe and build simple 3D shapes, including making nets -compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons -illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius -recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles. -describe positions on the full coordinate grid (all four quadrants) -draw and translate simple shapes on the coordinate plane, and reflect them in the axes. -recognise that shapes with the same areas can have different perimeters and vice versa -recognise when it is possible to use formulae for area and volume of shapes -calculate the area of parallelograms and triangles -calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm^3) and cubic metres (m^3), and extending to other units (for example, mm^3 and km^3). -interpret and construct pie charts and line graphs and use these to solve problems - solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts -solve problems involving similar shapes where the scale factor is known or can be found

Calculation Policy

This calculation policy sets out the methods used to help our pupils with calculations and has been devised by staff to meet the requirements of the National Curriculum 2014. It was also designed to ensure progressive and smooth steps are taken through calculation across and within year groups.

Each year group will represent new concepts using abstract, pictorial and concrete resources to embed the children's understanding. New learning will be put into practical and contextualised problems to help make the learning real for the children. Feedback will be given as immediately as possible in line with the school feedback policy. Children will have regular opportunities to practice their learning using the Rosenshine principles (2012).

Whilst the policy is designed to ensure the clear progression of written methods is taught, teachers are still expected to teach and model to children efficient methods of calculation: examples of these can be seen in the schools arithmetic policy.

Planning of lessons will be done daily with emphasis on using the assessment of each child from the previous lesson to inform future lessons. PUMA assessments will be used termly to identify gaps in children's learning that will then be incorporated into weekly quizzes or interventions as suitable. Children will undertake a yearly arithmetic test as outlined in the arithmetic policy with particular emphasis on the methods used by the children.

Addition

Throughout each year group, the use of the terms regrouping (not exchanging or borrowing) and ones (not units) will be consistent. Where these are present in resources from websites such as White Rose, it will be clearly explained what these terms mean but encourage children to use the school agreed terms when verbalising their answers. Synonyms will be explored with children but it will be explained that some of these are dependent on the situation that the term is used in. Throughout all year groups, the presentation of numbers (correct formation and one number in each square) will be a non-negotiable expectation. As children start to use formal written column methods, children will be expected to place one number in one square and ensure that the place value of each number matches correctly with the symbol on the right hand side.

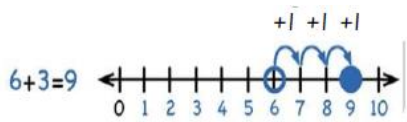
Year 1

Start with the statement first, then and now using practical situations (e.g. people stepping on and off a bus) to develop the understanding of the concept of addition.

As understanding develops, introduce the written calculation.
5 people are on the bus, 3 more people get on the bus, there are now 8 people on the bus.

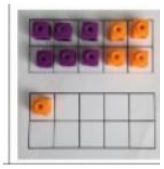
5 + 3 =8

Progress to counting on using a number line. Children are encouraged to start with the larger number and count on. **This must be explained to the children by introducing the idea of efficient calculation.**



Children will then progress to using their known number bonds to solve calculations. Children will use ten frames as a visual support and scaffold.

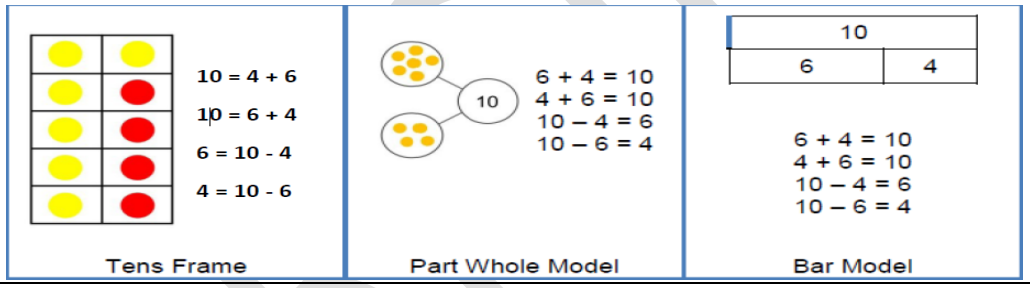
6 + 5 becomes 6 + 4 + 1



10+1=11

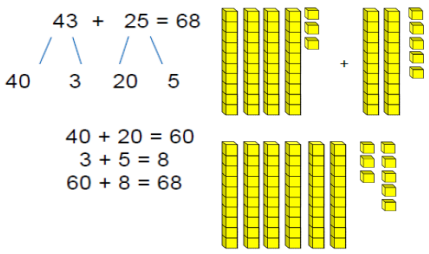
This can then be progressed into adding three numbers requiring fluent recall of number bonds to tens. This should not always be present in a linear fashion i.e. (6 +4 +2 (basic) to 6 + 2 + 4 (advanced))

Children to investigate tens frames, part whole models and bar models to visually represent calculations- note the inclusion of subitizing practice.



Year 2

Children will move onto adding 2 two digit numbers together using partitioning. This will be modelled with base ten first and then used as a scaffold with children eventually drawing tens and ones themselves. As in year 1, part whole and bar models will be used to visually support learning.



Children then progress to the principle of bridging ten by applying number bond to ten knowledge.

57+ 8 = 57+3= 60

60+5=65

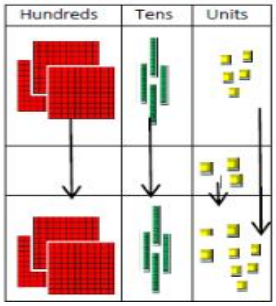
Year 3

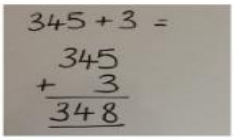
Children to calculate the following:

- 3 digit + ones
- 3 digit + tens
- 3 digits + hundreds

  As children's competence in calculation increases, these questions types will be calculated mentally.

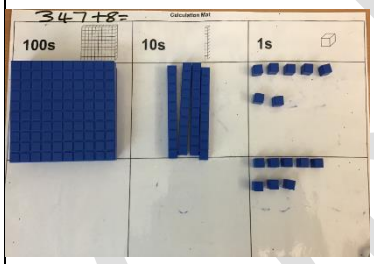
Visual images and base 10 used here to support learning. No regrouping at this point the aim is just for the children to develop the knowledge of place value. Column method presentation will be modelled at this point simultaneously with the calculation. Bar models used to support where needed.

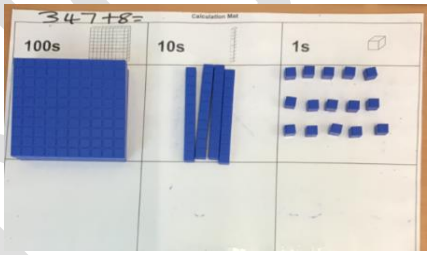


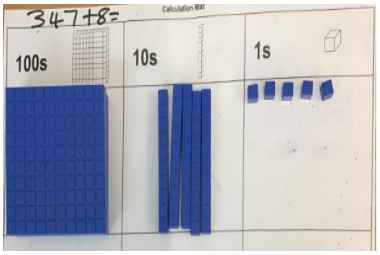


Children to calculate the following this time including regrouping:

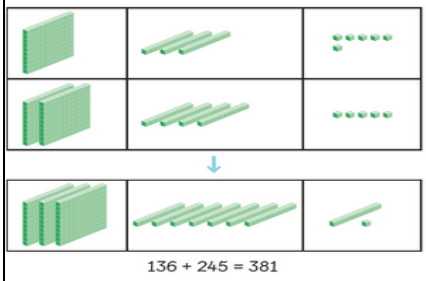
- 3 digit + ones
- 3 digit + tens
- 3 digits + hundreds



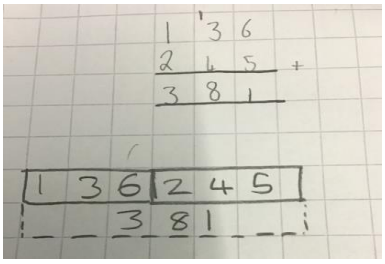




Children then progress to 2d+2d, 3d+2d, 3d+3d. Children will use base ten to secure the steps of learning (using the same process as above) and this will be removed appropriately- step-by-step with written column calculation, then just to check answer, then remove. Bar models used to support where needed.



Add ones.
Add tens.
Add hundreds.



Year 4

Children to calculate the following:

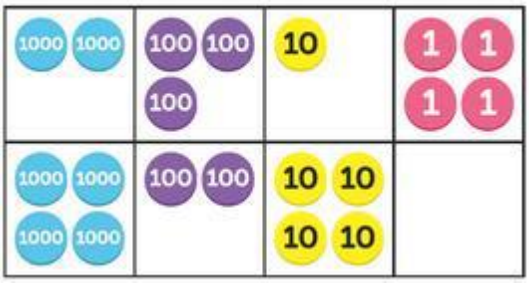
- 4 digit + ones
- 4 digit + tens
- 4 digits + hundreds
- 4 digit + thousands

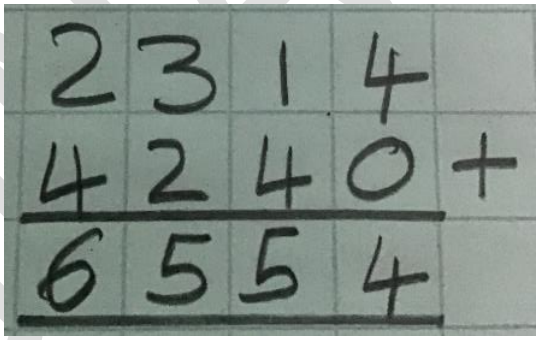
  As children's competence in calculation increases, these questions types will be calculated mentally.

Visual imagery and base ten used if necessary, however the practice of year 3 skills throughout the previous year should mean these can be calculated using mental strategies.

Children then further develop their understanding of the formal column written method of addition up to and including 4d+4d. If children require a scaffold, then base ten can be used or due to their secure understanding of regrouping, place value counters can be introduced due to being easier to manipulate when dealing with larger numbers.

Find the sum of 2314 and 4240.

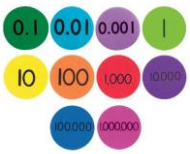


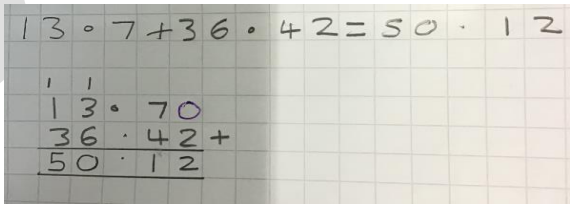


Year 5

Children to continue to develop their use of the column method of addition.

Children to apply this thinking to the addition of decimal numbers. Children should use place value counters to support their thinking if needed. Children should be exposed to calculations with varied amount of decimal places so the children can use place holders.





Year 6

No new addition statements.

Children will focus on developing mental and efficient strategies of addition.

Subtraction

Throughout each year group, the use of the terms regrouping (not exchanging or borrowing) and ones (not units) will be consistent. Where these are present in resources from websites such as White Rose, it will be clearly explained what these terms mean but encourage children to use the school agreed terms when verbalising their answers. Synonyms will be explored with children but it will be explained that some of these are dependent on the situation that the term is used in. Throughout all year groups, the presentation of numbers (correct formation and one number in each square) will be a non-negotiable expectation. As children start to use formal written column methods, children will be expected to place one number in one square and ensure that the place value of each number matches correctly with the symbol on the right hand side.

Year 1

Start with the statement first, then and now using practical situations (e.g. people stepping on and off a bus) to develop the understanding of the concept of subtraction.

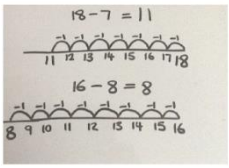
As understanding develops, introduce the written calculation.
8 people are on the bus, 3 people get off the bus, there are now 5 people on the bus.

5 -3 =5

Progress to counting back using a number line. Children are encouraged to start with the first number and count back- introduce part/whole. **Staff need to be mindful of how they explain which number is taken away. Avoid saying you take the small number from the large one as this can have ramifications further through school.**

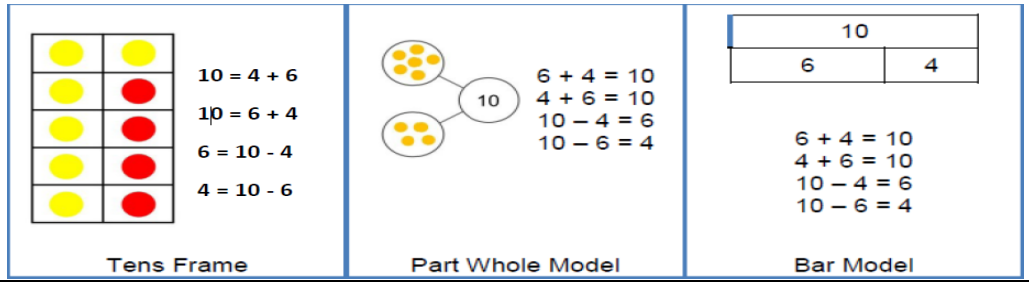
6 – 2 = 4

Children will then progress to drawing their own number line to solve these equations.



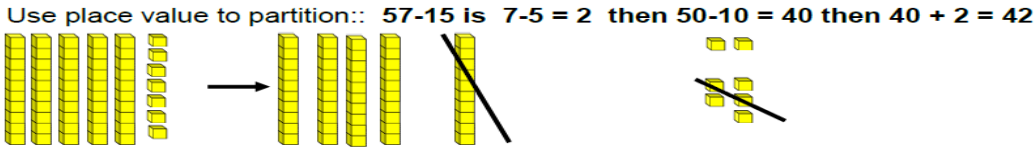
Children will then apply their number bond knowledge to solve questions including finding missing number questions i.e. 20 - □ = 15.

Children to investigate tens frames, part whole models and bar models to visually represent calculations and the relationship as the inverse of addition- note the inclusion of subitizing practice.



Year 2

Children will move onto subtracting 2 two digit numbers together using partitioning. This will be modelled with base ten first and then used as a scaffold with children eventually drawing tens and ones themselves. As in year 1, part whole and bar models will be used to visually support learning.



Children then progress to the principle of bridging ten by applying number bond to ten knowledge.

57 - 9= 57-7=50

50-2=48

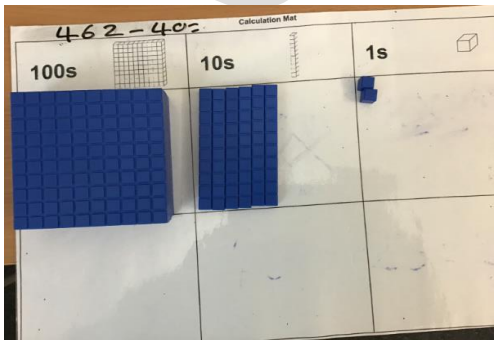
Year 3

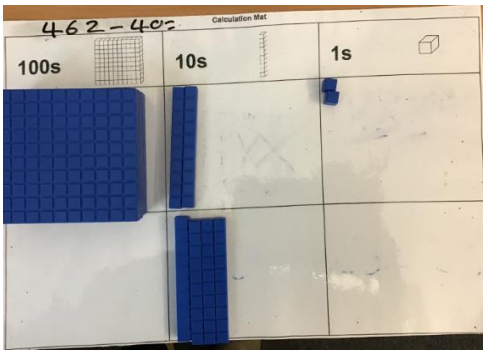
Children to calculate the following:

- 3 digit - ones
- 3 digit - tens
- 3 digits - hundreds

As children's competence in calculation increases, these questions types will be calculated mentally.

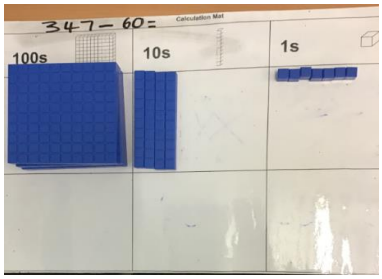
Visual images and base 10 used here to support learning. No regrouping at this point the aim is just for the children to develop the knowledge of place value. Column method presentation will be modelled at this point simultaneously with the calculation. Bar models used to support where needed.

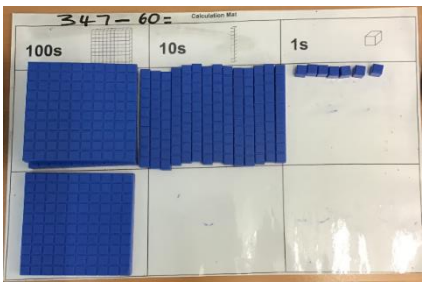


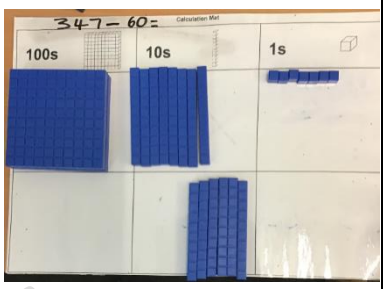


Children to calculate the following this time including regrouping:

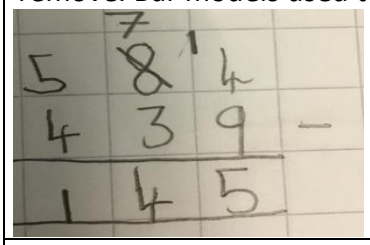
- 3 digit - ones
- 3 digit - tens
- 3 digits – hundreds

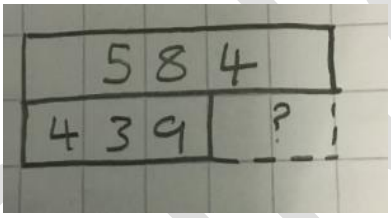






Children then progress to 2d-2d, 3d-2d, 3d-3d. Children will use base ten to secure the steps of learning (using the same process as above) and this will be removed appropriately- step-by-step with written calculation, then just to check answer, then remove. Bar models used to support where needed.





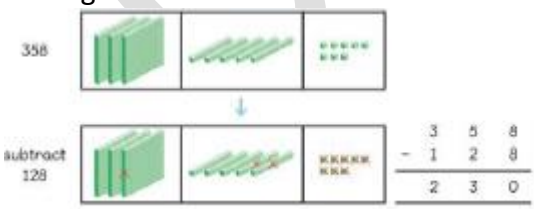
Year 4

Children to calculate the following:

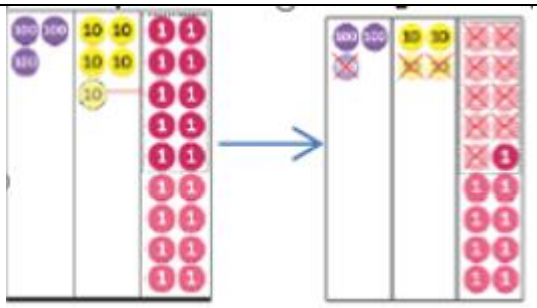
- 4 digit - ones
- 4 digit - tens
- 4 digits - hundreds
- 4 digit - thousands

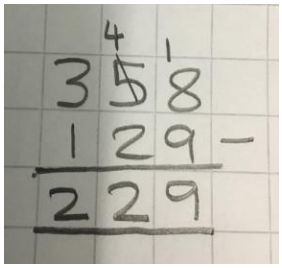
  As children's competence in calculation increases, these questions types will be calculated mentally.

Visual imagery and base ten used if necessary, however the practice of year 3 skills throughout the previous year should mean these can be calculated using mental strategies.



Children then further develop their understanding of the formal written method of subtraction up to and including 4d-4d. If children require a scaffold, then base ten can be used or due to their secure understanding of regrouping, place value counters can be introduced due to being easier to manipulate when dealing with larger numbers.

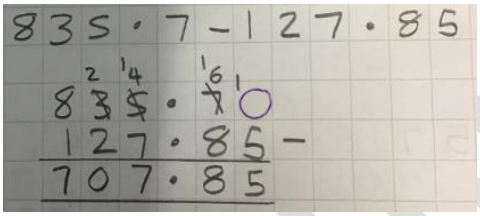




Year 5

Children to continue to develop their use of the column method of subtraction

Children to apply this thinking to the subtraction of decimal numbers. Children should use place value counters to support their thinking if needed. Children should be exposed to calculations with varied amount of decimal places so the children can use place holders.



Year 6

No new subtraction statements.
Children will focus on developing mental and efficient strategies of subtraction.

Multiplication

Throughout each year group, the use of the terms regrouping (not exchanging or borrowing) and ones (not units) will be consistent. Where these are present in resources from websites such as White Rose, it will be clearly explained what these terms mean but encourage children to use the school agreed terms when verbalising their answers. Synonyms will be explored with children but it will be explained that some of these are dependent on the situation that the term is used in. Throughout all year groups, the presentation of numbers (correct formation and one number in each square) will be a non-negotiable expectation. As children start to use formal written column methods, children will be expected to place one number in one square and ensure that the place value of each number matches correctly with the symbol on the right hand side.

Children will explore the idea of equal groups and repeated addition to develop the principle of multiplication. Children will begin to learn times table facts in year 2 with the expectation that by the end of year 4, children will be fluent up to 12 x 12 and the associated division facts (see the schools times table policy for further clarification). Vocabulary will be taught to children in practical situations to ensure that they understand how the meaning of this can change depending on the situation.

Year 1

Children will start by making equal groups of a wide range of practical resources.


Children will then group these equal groups to develop the understanding of multiplication being repeated addition. Children should start to organise their groups into arrays.

Three groups of five.
5 +5 + 5 = 15

Using practical resources, eg numicon, children will investigate the principle of doubling being two lots.

'double 3 is 6' 3 + 3 = 6 or 6 = 3 + 3

Year 2

Children will build on their knowledge from year 1 and continue to understand the principle of multiplication being repeated addition and setting practical equipment out in arrays. This should then be correlated with the written form of multiplication.

Children should use the knowledge or arrays and re-configure them to develop an understanding of the commutativity principle. Bar models will also be introduced to visually support the concept.

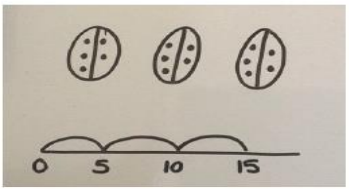
30		
10	10	10

3 x 5 = 15

5 x 3 = 15

Children will then progress to solving problems based on multiplication and calculate these using their own presented arrays.

I have 3 ladybirds with 5 spots each. How many spots do they have altogether?



Year 3

Children will start by developing their understanding of multiplying a number by ten. **This must be taught and explored practically and using place value mats to understand what happens to each number. Do not teach 'put a zero on the end'. This has implications further through school.**

Children will then progress this into use the above knowledge and applying this to known facts.

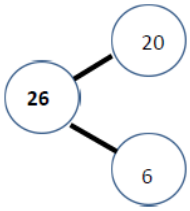
6X4 = 24 → 60 X 4= 240.

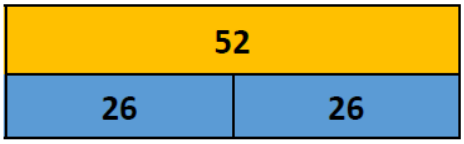
Children will then move onto exploring doubling two digit numbers by partitioning.

DOUBLE 20 = 40

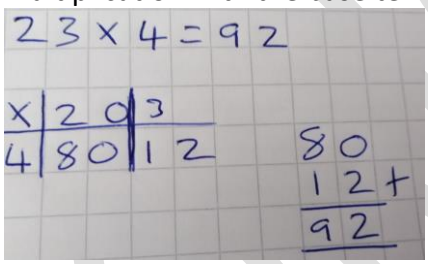
DOUBLE 6 = 12

40 + 12 = 52

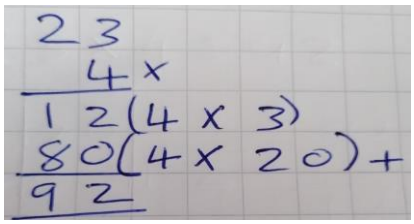




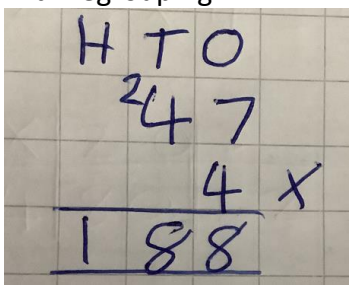
Children will then progress to a formal written methods of multiplication using base ten and place value mats. Grid method will initially be used to record the practical partitioning and
multiplication with the base ten.



As children's understanding develops, they will transition into the expanded column method. They will be discretely taught the importance of ensuring that their place value lines up correctly and numbers are written one in each square.



Finally, the children will condense the long method of multiplication into short method with regrouping.

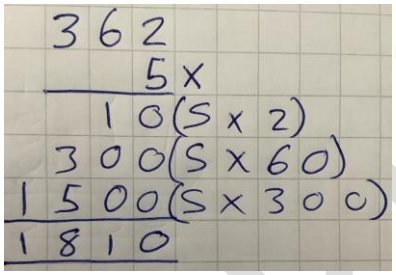


This should be explained as 7X4=28. Regroup 20. 40 X 4 = 160 + 20 = 180. Note the placing of the regrouping.

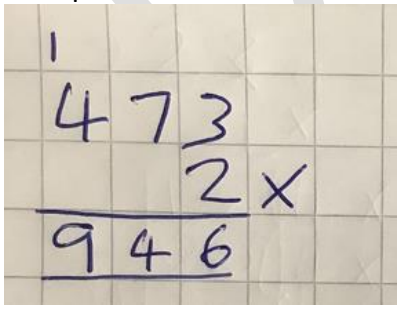
Year 4

Children will start by building on their knowledge of multiplying a number by ten by moving onto multiplying by 100. **Teachers should follow the same teaching notes as Y3 multiplying by 10.**

Children build on their column multiplication from year 3 by looking at the expanded method for multiplying four digit by one digit (children should only return to the grid method if it is needed as a scaffold for individual children). The teaching of this should be support by base ten and place value charts.



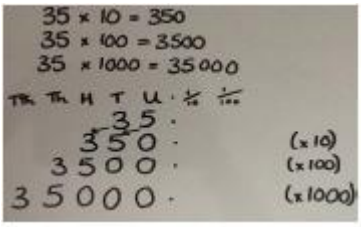
As the children become more confident, progress onto the short method of multiplication.



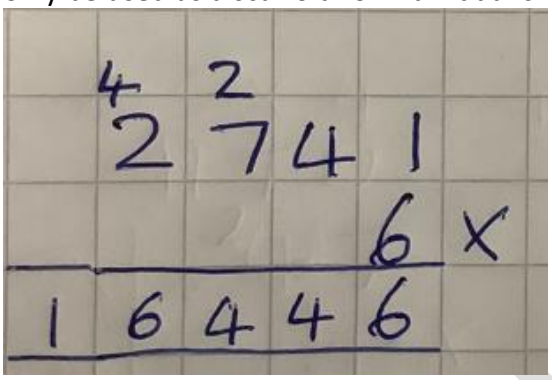
This should be explained as 3 X 2 =6. 70 X 2 = 140. Put down 40, regroup the ten. 400X2 = 800 + 100 = 900. Note the placing of the regrouping.

Year 5

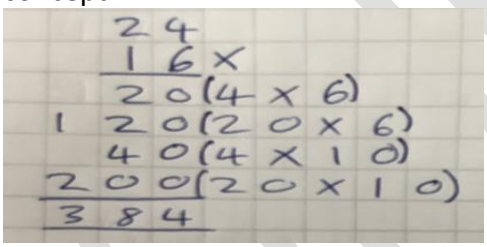
Children should start by multiplying numbers including those up to 2 decimal places by 10,100 and 1000 by moving numbers around a fixed decimal point.

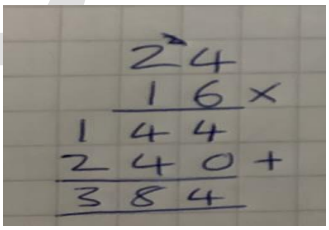


Children should progress to multiplying four digit number by a one digit number. Long method should not be needed as children should have a solid understanding of the short method of multiplication. Long method should only be used as a scaffold for individual children.



Children then progress onto multiplying two digit numbers by two digit numbers. Long method will need exploring with the children first to ensure that they understand the concept.





<u>Explanation</u>

First, multiply 4 by 6 to give 24; record the 4 in the units column and regroup the 20 as 2 tens in the tens column.

Next, multiply 20 by 6 to give 120; remember to add the 2 tens regrouped 120 + 20 = 140. Record 4 tens in the tens column and 1 hundred in the hundreds column.

Next, write a zero in the units column because you are multiplying by 10 (so the product will end in a zero which will be used as a place holder).

Then, multiply 4 by 10 to give 40; record a 4 in the tens column.

Now, multiply 20 by 10 to give 200 which is recorded with a 2 in the hundreds column.

Then add the 2 products together.

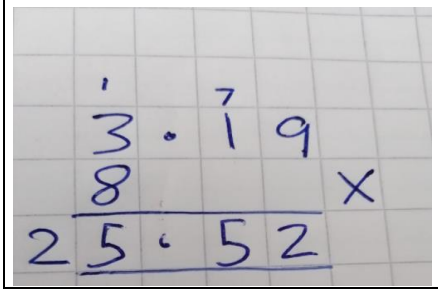
Children may choose to calulcate using the opposite approach i.e. in the first example 6X4 and 6x20. The key is they have a repeatable method and do not mix the two.

Children should then apply their knowledge of the concept above to multiply three and four digit numbers by two digits (*not all children may leave the year group secure on these two concepts).*

Year 6

Children will start by securing the calculation of three and four digit numbers by two digits.

Children will then move onto applying this to multiplying decimal numbers by whole numbers. It is imperative to ensure that the children present numbers in the appropriate place value position.



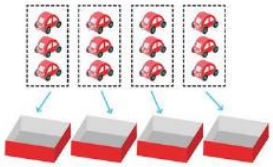
Division

Throughout each year group, the use of the terms regrouping (not exchanging or borrowing) and ones (not units) will be consistent. Where these are present in resources from websites such as White Rose, it will be clearly explained what these terms mean but encourage children to use the school agreed terms when verbalising their answers. Synonyms will be explored with children but it will be explained that some of these are dependent on the situation that the term is used in. Throughout all year groups, the presentation of numbers (correct formation and one number in each square) will be a non-negotiable expectation. As children start to use formal written column methods, children will be expected to place one number in one square and ensure that the place value of each number matches correctly.

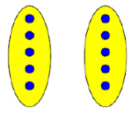
Children will explore the idea of sharing into equal groups to understand the principle of division. Vocabulary will be taught to children in practical situations to ensure that they understand how the meaning of this can change depending on the situation. When progressing to formal written methods, children will be expected to ensure that they write one number in a square and use place holders to ensure place value mistakes are reduced i.e 2444 ÷4 = 0611.

Year 1

Children will explore the concept of division using practical objects and the language equal grouping and equal sharing.



Children will then move onto dividing a quantity into a given array.



2 groups of 5

Year 2

Progress the use of division using arrays with the written division equation.

How many groups of 3 are in 12?

12 ÷ 3 = 4

Develop the concept of commutativity to understand the link between multiplication and division.

5 x 2 = 10 ——————— 10 ÷ 2 = 5

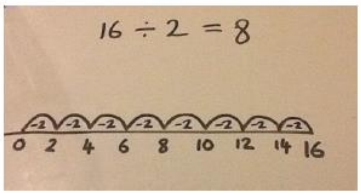
2 x 5 = 10 ——————— 10 ÷ 5 = 2

This can then be further developed to find missing numbers in division equations using multiplication facts.

5X4=20

20 ÷ □ = 5

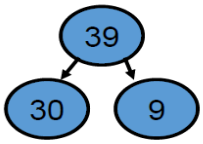
Move onto establishing the link between repeated subtraction and division. Children to perform jumps on a number line to help calculate this.



Year 3

Children will start by exploring their knowledge of times tables using number lines and number rods. This can be extended to base ten.

39 ÷ 3



30 ÷ 3 = 10

10 + 3 = 13

9 ÷ 3 = 3

Children will move onto investigating division of two digit numbers by one digit numbers using the short division method supported by base ten. Explanation should explain that if you share three tens between 3 people they all get one ten each. The 9 units each would result in three units each.

$$\begin{array}{r|ll} & 1 & 4 \\ \hline 7 & 9^{2} & 8 \end{array}$$

Year 4

Children will investigate the principle of dividing multiples of ten and a hundred by ten and a hundred.

This, along with knowledge of multiplication of multiplying by 10 and 100, will then be applied to knowledge of times tables to solve calculations. 350÷5= 35÷5=7 so 350 ÷5=70.

Progress the calculation of 2 digit by 1 digit into three digit divided by one digit including regrouping and the short division method. This should be modelled with base ten. Explanation should include the process of process of regrouping i.e. 124 ÷4, four people cannot be given one hundred each, if we regroup it so we now have 12 tens we can give three tens each, the four units can be shared one each so altogether each person has 31.

$$\begin{array}{r} 1\,5\,7 \\ \hline 3\,\big)\,4^{1}7^{2}1 \end{array}$$

Year 5

Children will begin by progressing their knowledge of dividing by ten and a hundred into numbers that will give a decimal answer.

Children will recap their knowledge of the formal short division method and progress to including remainders. This should be initially modelled with base ten to physically show the principle of a remainder.

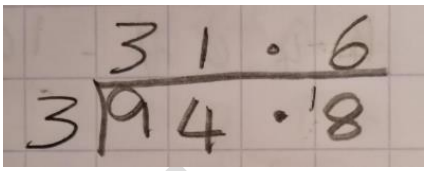
$$\begin{array}{r|l} & 8\ 6\ r\,2 \\ \hline 5 & 4\ 3^{3}2 \end{array}$$

This should then be progressed to dividing four digit numbers by one digit numbers including remainders. Base ten should only be used as a scaffold for children if needed.

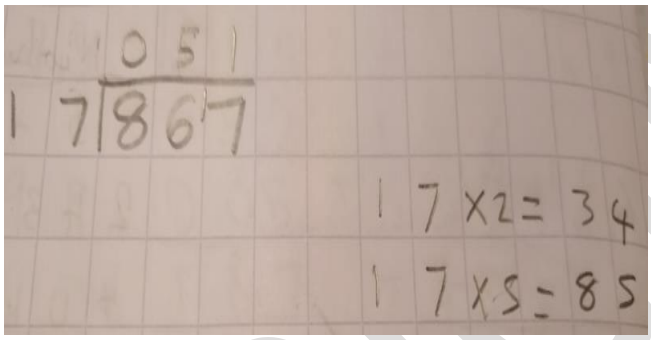
Year 6

Children will secure the division of four digit and three digit numbers and progress to representing remainders as decimals and fractions.

Children will then apply this knowledge to the division of decimals using the short division method. Children will be taught, as with addition, subtraction and multiplication, that decimal points are put in before any calculation takes place.



Children will then progress to the formal short method of division with 2 digit divisors. It should be modelled to the children how to write known facts at the side to help with calculation. Conversation should include using one of multiplying 2,5 or 10 as a starting point depending on which is the most appropriate.



Wath Victoria Primary School

2018-19

Updated September 2021

Maths Fluency

Document.

Rationale

Children are required by the end of the key stage 1 and 2 to perform calculations at pace. In 2018, the year 6 children were asked to perform 36 calculations in 30 minutes: around 50 seconds per question. The final question on the paper was 8827÷97, which will obviously take more than 50 seconds to answer. However, the opening question in the paper was 673 + 39, which should be done in far less than 50 seconds: closer to 10 in fact. To do this it is imperative that children are using the most efficient method and not always relying on one method of calculation.

Whilst the year 2 arithmetic is not done under a designated time constraint, we should still be setting high expectation of those age-related children to complete this in 20-30 minutes and also be using the most efficient method for each calculation.

The year 6 arithmetic paper compiles the calculation statements from year 3- year 6 as seen in the table below. It should be our aim that each child leaves the year group not only secure in calculating questions based on the curriculum statements, but are calculating at an appropriate pace and using the most efficient method. For children to be judged as age related, they should be answering their year group specific questions within the designated time using the suggested methods within reason. This end of year assessment is intended to provide evidence towards the final end of year judgement of that child: it is not the only piece of evidence that should be used. If a child gets 100% on the assessment, they should only be judged as GD if PUMA scores and evidence from class work back up this judgement. The grade boundaries have been calculated on the principle that in year 6 an expected child should be achieving at least 75% on an arithmetic paper and GD child should be achieving around 95%.

Table showing the breakdown of arithmetic papers 2016-1018.

	2016	2017	2018
Y3	3	2	3
Y4	3	7	6
Y5	14	10	12
Y5/6	4	1	2
Y6	12	16	14

Implications for teaching.

In 2016 the KS2 mental maths test was replaced with a written arithmetic test. Since then, the teaching of mental arithmetic strategies to children has declined. However, as seen in the information outlined above, children need to be using the most efficient strategies to solve questions. This may, at times, be mental methods of calculation drawing on key known number facts or patterns.

Over the last two years, we have developed the importance of practice to embed the learning of concepts in children. We no longer teach addition and then be 'done' with it until next year. We now consistently build on the knowledge the children gain and practice it in weekly tribe quizzes. This should be carefully planned as seen in appendix 3. As outlined above, it is now imperative that we start enabling children to have a variety of different strategies to solve questions based on the situation: the key to this is the ability to spot patterns in numbers. For example, children who are just secure with one method would do the calculation 699 + 101 in a column method. However, a children should be seeing the relationship of adding 1 then adding 100 which could in fact be done mentally or with only a small amount of notation. Weekly tribe quizzes need to be continued with careful thought into the questions being set to pupils. Children need to be set questions that provide practice in the formal methods of calculation but also ones that allow them to use other mental methods. Tribe quizzes should then also be followed up with whole class feedback with discussions developed around using efficient methods of calculation then an expectation that children take this on board. Opportunities for learning stops and plenaries should also be used during lessons to feedback on this also.

Again, key to this will be the relationships with adults in the classroom and the positive growth mindset of children and their ability to respond to challenge.

Year 3

1) 455 + 10=
2) 563 - 20=
3) 368 + 6=
4) 607 – 10 =
5) 587 + 9 =
6) 14 X 4 =
7) 64 ÷ 8 =
8) 2/7 + 4/7 =
9) 124 - 40=
10) 157 + 58 =
11) 546- 132=
12) 654- 97 =
13) 425 + 187 =
14) 13 X 8 =
15) 39 ÷ 3 =
16) 7/8- 4/8 =

Guidance

Children should complete the complete the 16 questions in 20 minutes. They should use (within reason) the methods indicated below. For a child to be working at age related they should be achieving at least 10 out of 16 using the appropriate methods. For GD children should be achieving 14 out of 16.

1) *Children should answer this question mentally.*
2) *Children should answer this question mentally.*
3) *Children should answer this question mentally (368+2+4 or 368+5+1)*
4) *Children should answer this question mentally.*
5) *Children should answer this question mentally. (587 +10-1)*
6) *Children should break this down to 10 X 4 = 40 4X4= 16 and add them together. They may do this mentally or written down.*
7) *Children should answer this question mentally through recalling times table facts.*
8) *Children should try to answer this question mentally but may choose to use images if needed.*
9) *Children should try to answer this question mentally (count back in tens or -20-20) but may choose to use written method.*
10) *Children should use the column method for this question.*
11) *Children may recognise this can be done mentally due to no regrouping but they may choose to record it using written column method.*
12) *Children may recognise this can be done mentally (-100 + 3) but they may choose to record it using written column method.*
13) *Children should use formal column method.*
14) *Children should break this down into 10X8 and 3X8 and add them together. The may do this mentally but most will record it in a written form.*
15) *Children should recognise that 3 x 12= 36 so this is one more 3 and equal 13. The may also choose to do 30÷3 and 9 ÷ 3 and add the answers together.*
16) *Children should try to answer this question mentally but may choose to use images if needed.*

Year 4

1) 3683+ 10=
2) 309 - 10=
3) 45÷0 =
4) 4683 + 1000=
5) 9623- 2000=
6) = 243 + 125
7) 673 – 231=
8) 14 X 6 =
9) 69 X 8 =
10) 127 X 7 =
11) 683 X 7 =
12) 5 X 4 X 3 =
13) 83 ÷ 1 =
14) 190 ÷ 10 =

15) 200 ÷ 100 =
16) 56 ÷ 10 =
17) 68 ÷ 100=
18) 7/10 – 4/10 =
19) 3004 – 1452=
20) 3999 + 1456=
21) 3784 + 198=
22) 2106 – 198=

Guidance

Children should complete the complete the 22 questions in 25 minutes. They should use (within reason) the methods indicated below. For a child to be working at age related they should be achieving at least 15 out of 22 using the appropriate methods. For GD children should be achieving 19 out of 22. Children should also be monitored to ensure they are track to be fluent in the recall of times tables up to 12 X 12 and begun to be fluent in the subsequent division facts.

1) *Children should answer this mentally.*
2) *Children should answer this mentally.*
3) *Children should answer this mentally.*
4) *Children should answer this mentally.*
5) *Children should answer this mentally.*
6) *Children may use a written method of calculation. Children working at or towards GD should identify that there is no regrouping so this could be done mentally.*
7) *Children may use a written method of calculation. Children working at or towards GD should identify that there is no regrouping so this could be done mentally.*
8) *Children may use a written long multiplication. A more appropriate method would be mentally (with possible note making of the two answer) calculating 10 X 6 and 4 x 6 and adding them together.*
9) *Written long multiplication*
10) *Written long multiplication*
11) *Written long multiplication*
12) *Children should calculate this mentally using their known facts. However, they may choose to note down their working.*
13) *Children should answer this mentally.*
14) *Children should answer this mentally.*
15) *Children should answer this mentally.*
16) *Children should answer this mentally. Some children may choose to draw a place value grid to support their thinking.*
17) *Children should answer this mentally. Some children may choose to draw a place value grid to support their thinking. Some children may choose to note their thinking i.e. 68÷10=6.8 6.8 ÷10.*
18) *Most children should calculate this mentally. Some children may choose to note down their thinking.*
19) *Children should use written method with correct use of regrouping.*
20) *Children should use written method with correct use of regrouping. GD or working towards this children may see that you can do 3999 + 1 = 4000 then add 1455 mentally but this should not be expected.*
21) *Children should use written method with correct use of regrouping.*

22) *Children should use written method with correct use of regrouping.*

Year 5

1) 17 X 5 =
2) 156 ÷12=
3) 1009 – 10 =
4) 236 + 563=
5) 919- 717=
6) 45 ÷ 10 =
7) 95÷100=
8) 789÷1000=
9) 5.6 x 1000=
10) 0.5 x 100=
11) 1997 + 7843=
12) 9106 – 1987=
13) 8920+ 12368=
14) 29038- 2783=
15) 1637 - _____ = 1124
16) 40 X 60=
17) 392 X 8 =
18) 1748 X 9 =
19) 1275 X 12 =
20) 121 ÷ 11 =
21) 1422 ÷ 9 =
22) 490 ÷ 7 =
23) ¾ + ¾ =
24) ¾ - 1/12=
25) ½ + 1/3 + 2/6 =
26) 15 X ____ = 90
27) 194.7 + 23.64=
28) 30 – 15.67=
29) 0.12 + 5.6 + 125=
30) _____ + 237 = 2379

Guidance

Children should complete the complete the 30 questions in 30 minutes. They should use (within reason) the methods indicated below. For a child to be working at age related they should be achieving at least 21 out of 30 using the appropriate methods. For GD children should be achieving 27 out of 30. Children should also be routinely checked on their times tables up to 12 X 12 and the subsequent division facts. They should be tested on the times table check (appendix 2) and achieve above 85% in 12 minutes as evidence towards an at judgment.

1) *Children should use known facts of 10X5 and 7X5 and calculate this mentally. They may choose to note down answer to add together to find the answer.*
2) *Children should use the known fact of 144 ÷ 12 = 12 so 156 is one more 12 therefore 13. They should recognise this mentally rather than needing a bus stop method.*
3) *Children should calculate this mentally. 1009- 9 = 1000-1*

4) *Children may choose to use a column method. However, it would be hoped that children would recognise there is no regrouping and calculate it mentally.*
5) *Children may choose to use a column method. However, it would be hoped that children would recognise there is no regrouping and calculate it mentally.*
6) *Children should calculate this mentally.*
7) *Children should calculate this mentally. They may choose to break it down and note their thinking (95÷10 = 9.5 9.5÷10=0.95).* ***They should not use short division method.***
8) *Children should calculate this mentally. They may choose to break it down and note their thinking (789÷10 = 78.9 78.9 ÷10=7.89 7.89÷10=0.789).* ***They should not use short division method.***
9) *Children should calculate this mentally. They may choose to break it down and note their thinking (5.6 X10 = 56 56X 10 = 560 560 X 10 = 5600).* ***They should not use formal written multiplication.***
10) *Children should calculate this mentally. They may choose to break it down and note their thinking (0.5 X 10 = 5 5X 10 = 50).* ***They should not use formal written multiplication.***
11) *Most children will perform a column method which is fine. Ideally, children will see that you can add 3 to make 2000 then add 7840.*
12) *Children should use the formal column method with correct regrouping.*
13) *Children should use the formal column method with correct regrouping.*
14) *Children should use the formal column method with correct regrouping.*
15) *After identifying the part and whole situation (they may choose to draw a bar diagram to support their thinking), children should use the formal column method with correct regrouping.*
16) *Children should calculate this mentally using known facts. They may record their thinking (4 X 6 = 24 40X6= 240 40 X 60= 2400).* ***Children should be discouraged from using formal written methods.***
17) *Children will use formal long multiplication.*
18) *Children will use formal long multiplication.*
19) *Children will use formal long multiplication.*
20) *Children should calculate this mentally using known facts.*
21) *Children should calculate using formal short division.*
22) *Children should recognise that 49 ÷ 7 = 7 so 490 ÷ 7 = 70. Children may use the formal short division.*
23) *Children should calculate mentally and then ensure that they turn an improper fraction into a mixed number.* ***It is important that children always convert improper fractions to mixed numbers unless asked otherwise.***
24) *Children should convert ¾ to 9/12 then perform the calculation. They may choose to turn it into other common denominators (i.e. 24ths) but should be encouraged to choose the option that requires fewer steps.*
25) *Children should convert the ½ and 1/3 into 6ths then perform the calculation. They may choose to turn it into other common denominators (i.e. 12ths) but should be encouraged to choose the option that requires fewer steps.*
26) *Children should calculate this mentally using strategies like 15 X 2 = 30 so three lots of this = 90 therefore the answer is 6 or children may choose to count in 15s.*
27) *Children should use a formal column method ensuring that correct place value is used when written down. Children should be using place holders in order to support their thinking and the correct use of regrouping.*

28) *Children should use a formal column method ensuring that correct place value is used when written down. Children should be using place holders in order to support their thinking and the correct use of regrouping.*
29) *Children should use a formal column method ensuring that correct place value is used when written down. Children should be using place holders in order to support their thinking and the correct use of regrouping.*
30) *After identifying the part and whole situation (they may choose to draw a bar diagram to support their thinking), children should use the formal column method with correct regrouping.*

Year 6

Work throughout year 6 should be aimed towards ensuring the children are well equipped for the demands of the KS2 arithmetic test.

Appendix 1: examples of formal written methods of calculation.

Addition and subtraction

789 + 642 becomes

```
      7 8 9
    + 6 4 2
  -----------
    1 4 3 1
      1 1
```

Answer: 1431

874 – 523 becomes

```
      8 7 4
    – 5 2 3
  -----------
      3 5 1
```

Answer: 351

932 – 457 becomes

```
      8  12  1
      ~9 ~3  2
    – 4  5   7
  -----------
      4  7   5
```

932 – 457 becomes

```
        1   1
      9 3   2
    – ~4 ~5 7
        5   6
  -----------
      4 7   5
```

Answer: 475

Answer: 475

Long multiplication

24 × 16 becomes

```
      2
      2 4
    × 1 6
  -------
    2 4 0
    1 4 4
  -------
    3 8 4
```

Answer: 384

124 × 26 becomes

```
        1 2
      1 2 4
    ×   2 6
  -----------
    2 4 8 0
      7 4 4
  -----------
    3 2 2 4
    1 1
```

Answer: 3224

124 × 26 becomes

```
      1 2
      1 2 4
    ×   2 6
  -----------
      7 4 4
    2 4 8 0
  -----------
    3 2 2 4
    1 1
```

Answer: 3224

Short division

98 ÷ 7 becomes

```
        1 4
      ------
    7 | 9 8
        2
```

Answer: 14

432 ÷ 5 becomes

```
          8 6 r 2
      ----------
    5 | 4 3 2
        3
```

Answer: 86 remainder 2

496 ÷ 11 becomes

```
          4 5 r 1
      ----------
  1 1 | 4 9 6
        5
```

Answer: 45 $\frac{1}{11}$

Progression of tribe quiz.

Example of year 5 progression.

The splitting of topics into is purely to demonstrate the progression of practice. Topics still should be given the appropriate time that is needed. The idea shown below is that as the year progresses so should the build-up in what is being practiced. Once all the fundamental arithmetic strands have been practiced, time should be spent developing the children's ability to reach their end of year goal.

Month	Current teaching	Tribe quiz
September	Place value	N.A.- focus on times tables.
October	Addition and subtraction	Place Value, Addition and subtraction. 10 questions 20 mins
November	Multiplication and division	Place Value, Addition, subtraction, multiplication and division. 12 questions 20 mins
December		
January	Fractions	Place Value, Addition, subtraction, multiplication, division and fractions. 15 questions 20 mins
February		
March	Measures	Place Value, Addition, subtraction, multiplication, division and fractions. This time should be spent practicing getting the children prepared for the end of year goal of 30 in 30 mins with suitable scaffolding.
April	Shape	
May	Data handling	
June		
July	Any issues that have arisen from PIRA.	

Times Table Policy

Wath Victoria

January 2020

Intent

At Wath Victoria, we believe that the knowledge of Times Tables is an essential element needed for the progression of Mathematical understanding. We aim for all children to know their Times Tables by the end of Year 4 and have strategies to work out any if unable to rapidly recall the fact.

The progression of Times Table knowledge is broken down year by year and children will be expected to achieve certain goals by the end of each academic year.

	Progression of teaching
Year 1	By the end of Year 1 children are expected to be fluent in counting in: 2's, 5's and 10's
Year 2	By the end of Year 2 children are expected to make the link between counting and their times tables. Children will be fluent in Times Tables of 2,5,10.
Year 3	By the end of Year 3 children are expected to retain the learning of Year 2 and be able to fluently recall multiplication facts for 2's, 5's and 10's. Children will also learn multiplication facts for the 3, 6, 4 and 8 Times Table.
Year 4	By the end of Year 4 children are expected to retain, use and apply learning of multiplication facts for all previously learnt Times Tables. Children will also learn multiplication facts for the 7, 9, 11 and 12 Times Table.

Implementation

The method of teaching Times Tables is decided up on by the individual teacher and what they deem as most effective for their class and how to best meet the needs of their children. However, a recommended method is for children to first learn to count in the number they are trying to learn and then making links using the repeated addition.

It is also advised that teachers use a wide range of activities to best support the learning. This may include:

Counting sticks
Chanting and songs
Times table grids
Games and challenges

The table above shows the progression of teaching and the expectation of where children should be. For many reasons some children may not be able to maintain this expectation and will not be secure with an end of year expectation. For these cases the child will need to work to the same progression but not within the same time brackets. Children need to be secure with each step before progressing on to the expectations of the following year. As well as this, for those children who meet end of year expectations early and are fully secure with their current learning it would be appropriate for them to move on to the next years times table learning.

To ensure best practice and effective consolidation of the Times Tables, teachers will implement a retrieval practice format in their classrooms. Times Table practice must be in place several times within the week so children can become familiar with them and there is a greater chance of the learning staying in their long term memory. Teachers can place the revision of Times Tables in to:

- Tribe Quest
- Daily Dashboard
- Maths starters
- Morning tasks
- End of day tasks
- Any spare moments within the day (for example, while getting changed for P.E)

In the school hall a Times Table display shows the successes of children in relation to their Times Tables both in school and at home. This will further engage children with their Times Tables and further encourage their home learning. As well as this display, it is expected for classrooms of Year 2 through to Year 4 to have some display that will encourage and further the learning of Times Tables.

All KS2 will have their own account for Times Table Rock Stars and will be able to practice the Tables they are learning at home. As well as this, the 'battle' feature will be used so classes can compete against one another so children will be engaged through competition. Winning teams will receive rewards and individuals who make considerable efforts will receive individual prizes as well as going on the display in the school hall.

Impact

Teachers are responsible for the on-going assessment of children and their knowledge of Times Tables. This should be clear for teachers to see as they will see attainment through the regular practices.

Once every half term a formal assessment will be done by teachers to check on the attainment. These assessments will only be on the Times Tables that the children have learnt at that stage.

Assessments should follow the below formats.

Year 2	Autumn 1 – 20 questions – 5 minutes Autumn 2 – 20 questions – 4 minutes Spring 1 – 25 questions – 4 minutes Spring 2 – 25 questions – 3 minutes Summer 1 – 30 questions – 3 minutes Summer 2 – 30 questions – 2 minutes
Year 3	Autumn 1 – 25 questions – 5 minutes Autumn 2 – 25 questions – 4 minutes Spring 1 – 30 questions – 4 minutes Spring 2 – 30 questions – 3 minutes Summer 1 – 40 questions – 3 minutes Summer 2 – 40 questions – 2 minutes
Year 4	Autumn 1 – 30 questions – 5 minutes Autumn 2 – 30 questions – 4 minutes Spring 1 – 40 questions – 4 minutes Spring 2 – 40 questions – 3 minutes Summer 1 – 50 questions – 3 minutes Summer 2 – 50 questions – 2 minutes

Following each assessment point teachers will compile the data to look and see what gaps are evident. Suitable interventions can then be put in place to help boost children so they are alongside the year group expectations. On-going assessment of the schools approach to the teaching of Times Tables will be monitored through the results of the Y4 multiplication check.