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Year 4 LTP Maths

Year 4 Key Representations

Find out more…

Watch the **Unit tutorial** before planning each unit and read the **Unit Narrative.**

Read the **planning guides** for suggestions of representations.

Make use of **PD videos** on unit pages and Progression in Calculations page.

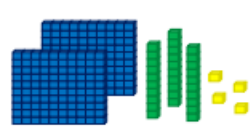
Equations

The phrase **'is equal to'** is used consistently to refer to the = symbol. Equations should be presented with symbols and missing numbers in different positions:

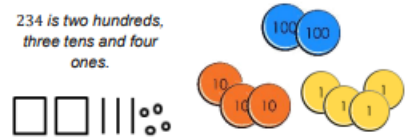
$$38 = 25 + 13$$
$$\square = 37 + 44$$
$$12 \div \square = 4$$

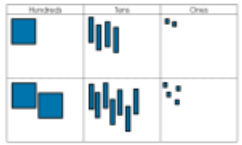
Representations of number

Pupils are familiar with a range of concrete and pictorial representations of number with and without a place value chart. These are used to represent a number or calculation and should not be used as a counting tool. Pupils also make use of these when comparing numbers.



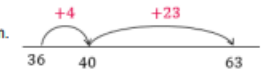
234 is two hundreds, three tens and four ones.





Number lines

Number lines can be used to represent and compare, demonstrating the continuous nature of the number system. When calculating, number lines may act as a jotting of the steps of a mental calculation and may begin 'empty' i.e. not have numbered divisions. They are also used as a representation for rounding.



Number fact knowledge

Pupils know number bonds to 100 and apply to other multiples of 10. Pupils are increasingly fluent in a range of number facts including partitioning in different ways to discuss number.

136 is multiple of 4 because I can see 120 and 16 which are both multiples of 4.

They are also familiar with multiplication tables for 2, 3, 4, 5, 6, 8 and 10 and related division facts.

$$6 \times 8 = 48 \quad 48 \div 8 = 6$$

Make use of transitions and Maths Meetings to develop this.

Deriving facts and inverse relationships

Pupils use known facts such as number bonds and understanding of place value and magnitude to derive further facts.

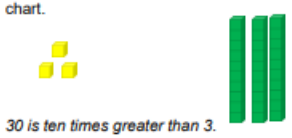
If I know $12 + 5 = 17$ *then* $222 + 5 = 227$
If I know $3 \times 4 = 12$ *then I know* $6 \times 4 = 24$

Inverse relationships have also been explored.

If I know $12 + 5 = 17$ *then* $17 - 12 = 5$
If I know $3 \times 4 = 12$ *then I know* $12 \div 4 = 3$

Multiplication and division by powers of 10

Pupils have experienced the concept of ten times greater and smaller through exchanging Dienes, linking this to the apparent move of digits in a place value chart.

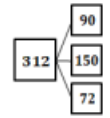


30 is ten times greater than 3.

Part-whole language and representations

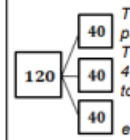
A part-whole model is used to represent the relationship between numbers in all four operations. The model is made of a **whole** and two or more **parts**.

We know the whole is 312 and the value of one part is 190. We can use subtraction to find the missing part.



There are three parts.
$90 + 150 + 72 = 312$

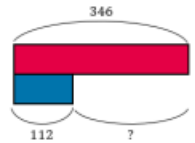
Using multiple **equal** parts represents multiplicative relationships.



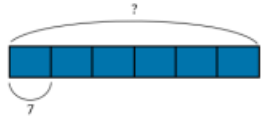
There are three equal parts with a value of 40. The whole is 120. 40 multiplied by 3 is equal to 120.
120 divided into three equal parts is equal to 40.

Bar models

Pictorial bar models and concrete Cuisenaire as bar models are used to represent **part-whole relationships** and **knowns and unknowns** within problems in all four operations. See PD videos for further exemplification.



I know the whole is 346*, and one of the parts is* 112*. I do not know the value of the missing part. I can subtract* 112 *from* 346*.*



The value of each part is seven and there are six equal parts. The whole is unknown. Six groups of seven is equal to 42. The whole is 42.

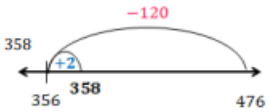
Mental strategies

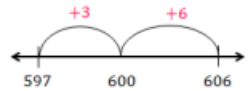
Pupils have experienced a range of mental strategies for all four operations, including:

- Applying number bonds to 10 and 100 to calculate how many more/less to the next multiple of ten, extending to 100 and 1000, using the 'make 10' strategy.
- Identifying numbers close to a multiple of ten or 100 e.g. 28, 201 and using a round and adjust strategy, including for multiplication. *"If I know 20 x 4 is 80, then 19 x 4 is 76".*
- Identifying near doubles for addition. *43 and 45 can be seen as 'double 43 plus two.'*
- Subtracting numbers close together in value, through counting on to find the difference.

$336 + 127 = ?$ *I can partition 27 into 123 and 4. 336 plus 4 is equal to 340. 340 plus 123 is equal to 463.*

$476 - 118 = 358$





$606 - 597 = ?$ *I can count on from* 597 *to* 606*. The difference is* 9*.*

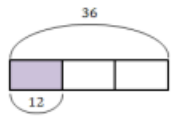
Representing fractions

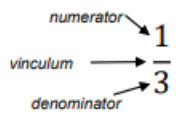
A range of concrete and pictorial representations have been used for fractions including fractions of a whole, as part of a set of objects and as part of a quantity such as a length or volume. Pupils can apply these representations to comparing, finding simple equivalence and adding and subtracting with the same denominator, as well as fractions of sets or quantities.

One third is one of three equal parts

$\frac{1}{3}$ *is equivalent to* $\frac{2}{6}$

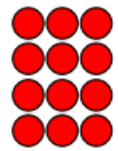
One third of 36 *is* 12*.*





Representing multiplicative relationships

Pupils have represented multiplicative relationships concretely and pictorially, primarily through arrays, Cuisenaire and bar models. A focus on equal parts, the number of equal parts and the value of each part supports understanding of commutativity and inverse relationships. The representations and language structures support written strategies.



There are four groups each with a value of 3.
There are three groups each with a value of 4.
I can see three, four times.
I can see four, three times.

12 divided into groups of 4 gives three groups
12 shared into four groups gives 3 in each group

Year 4 Maths Vocabulary

Area
The space a surface takes up inside its perimeter

The area is 15cm²

Associative Law
No matter how the parts in an addition or multiplication are grouped the answer will be the same

(6 + 3) +2 = 11
6 + (3 +2) = 11

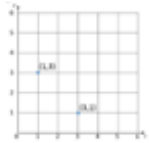
Convert
To change from one unit of measurement to another

2km can be converted to 2000m

Decimal Fraction
A fraction expressed in its decimal form

½ = 0.5

Coordinate
The position of a point, usually described using numbers



Dividend
The amount you want to divide

Divisor
The amount you divide by

Protractor
A device for measuring the size of an angle (measured in degrees)

Expression
One or a group of numbers, symbols or operators

2 X 3
17²

Improper Fraction
A fraction where the numerator is bigger than the denominator

$\frac{15}{11}$

Simplify
To write a number or equation in its simplest form

I can simplify $\frac{4}{10}$ to $\frac{2}{5}$

Kite
A 2D shape with two pairs of equal length adjacent sides

Integer
A whole number that can be positive or negative

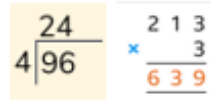
6 is an integer, 0.6 is not

Interval
An interval on a graph's axis lies between two values

If one point on an axis is 20 and the next 30, the interval is 10

Short Division
A formal written layout where the quotient is calculated showing only one written step

Short Multiplication
A formal written layout where the multiplier is 9 or less



Isosceles
Having two sides of equal length

An isosceles triangle

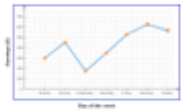
Mixed Numbers
Numbers consisting of an integer and fractional part

$1\frac{1}{2}$
$9\frac{3}{4}$
$23\frac{11}{20}$

Distributive Law
The process whereby adding numbers and then multiplying the sum gives the same answer as multiplying the numbers separately and then adding the products

3 x (2+4) = (3x2) + (3x4)
3 x 12 = (3x10) + (3x2)

Line Graph
A graph that uses lines to connect the points on a data chart. Used to present continuous data



Negative Number
A number that is less than zero.

-3
- 2.8
- 0.5

Positive Number
A number that is greater than zero

3
2.8
0.5

Quotient
The result when the dividend is divided by the divisor

In 15 ÷ 3 the quotient is 5

15 ÷ 3 = 5

Rhombus
An equilateral parallelogram with four equal length sides

Parallelogram
A 2D shape that has two pairs of parallel sides and equal opposite sides

Trapezium
A quadrilateral with exactly one pair of parallel sides

Proper Fraction
A fraction with a value less than one

$\frac{1}{2}$
$\frac{3}{4}$
$\frac{5}{8}$

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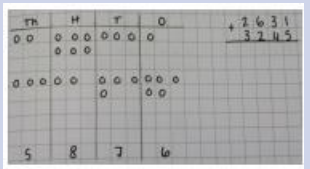
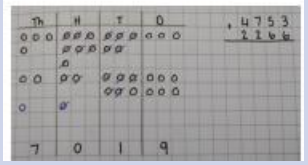
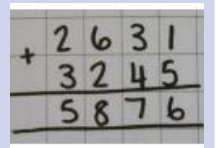
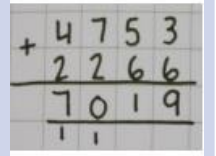
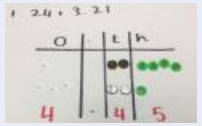
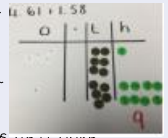
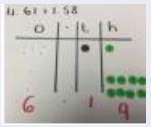
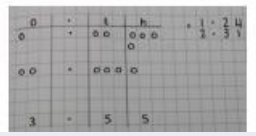
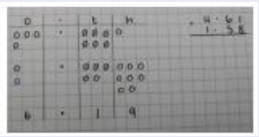
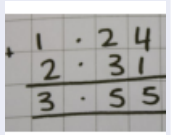
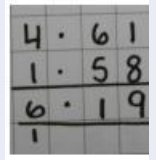
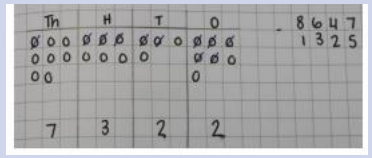
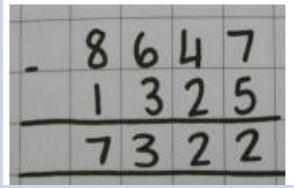
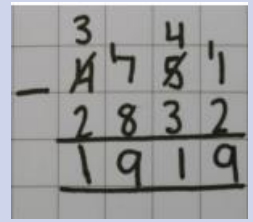
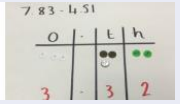
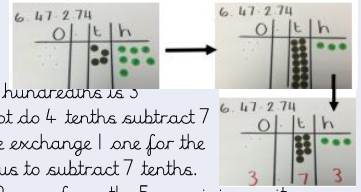
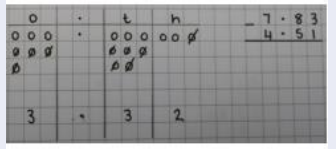
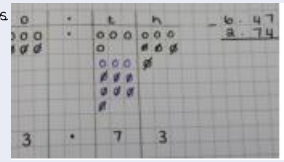
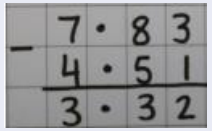
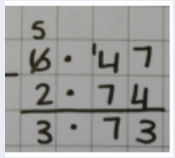
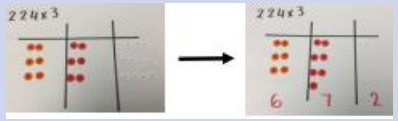
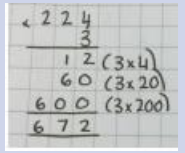
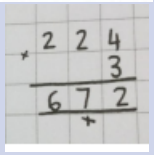
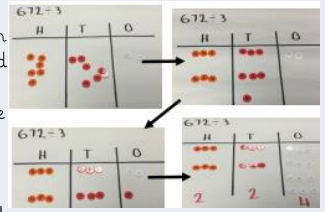
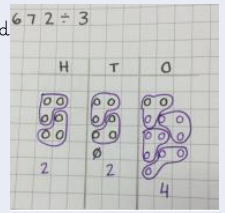
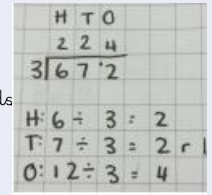
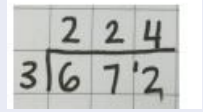
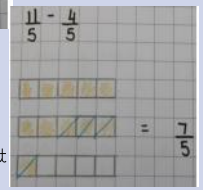
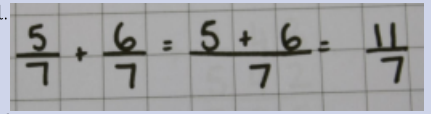
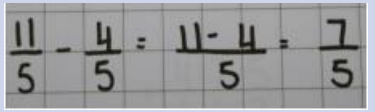
Calculation Policy Year 4

NC statement and guidance	CPA
Add four number up to four digits using the formal written method. Children build upon calculation skills developed in Year 3. Prior to the methods taught below, concrete methods (as modelled in Year 3) are used to support conceptual understanding. Note – as part of calculation, children are taught to estimate the answer to a calculation and use the inverse to check answers.	Children use a pictorial method to aid conceptual understanding of addition of whole numbers up to four digits. This includes adding numbers with different amounts of digits. Examples are carefully structured to begin with those that do not require exchange. When modelling this method, children's place value knowledge is reinforced. Looking at the second example. 3 ones add 6 ones is 9 ones. 5 tens add 6 tens is 11 tens which make 1 hundred and 1 ten. We carry this 1 hundred into the hundred column. 7 hundreds plus 2 hundreds plus 0 hundreds is 10 hundreds which make 1 thousand which are added into the thousands column. 4 thousands plus 2 thousands plus 1 thousand is 7 thousands.   Once children are secure in concrete and pictorial methods, they move onto the formal written method.  As with previous methods, children's place value knowledge is reinforced through the modelling of this method as demonstrated with the pictorial method. examples are carefully structured to support conceptual understanding. 
Add numbers with up to 2 decimal places using the formal written method In order in begin to add decimal numbers children progress carefully through concrete, pictorial and abstract method. Note – as part of calculation, children are taught to estimate the answer to a calculation and use the inverse to check answers.	Children use place value counters (and/or base ten) to begin to add decimal numbers. Including examples which have different amounts of digits.  Examples are carefully structured beginning with questions that do not require exchange. When modelling this method children's place value knowledge is reinforced. Use the example below: 1 hundredth add 8 hundredths is 9 hundredths. 6 tenths add 5 tenths is 11 tenths we exchange 10 of these tenths for 1 one into the ones column. 4 ones plus 1 one plus 1 one gives us 6 ones.   Children use visual maths to add numbers with up to two decimal places including number which have different amounts of digits. They use place holders where necessary. Examples are carefully structured beginning with questions that do not require exchange. When modelling this method, children's place value knowledge is reinforced as demonstrated in the concrete method.   Once children have a secure conceptual understanding of addition of decimals, they move onto a formal written method.  As previous methods, children's place value knowledge is reinforced as demonstrated in the concrete method. 

Calculation Policy Year 4

NC statement and guidance	CPA
Subtract number with up to four digits using the formal written method Children build upon calculation skills developed in Year 3. Prior to the methods taught below, concrete methods (as modelled in Year 3) are used to support conceptual understanding. Note – as part of calculation, children are taught to estimate the answer to a calculation and use the inverse to check answers.	Children use a pictorial method to aid conceptual understanding of subtraction of whole numbers up to four digits. This includes subtracting numbers with different amounts of digits. Example are carefully structured to begin with those that do not require exchange. When modelling this method, children's place value knowledge is reinforced. Looking at the example (right). We can not do 1 one subtract 2 ones and therefore we exchange 1 ten from the tens column. 11 ones subtract 2 ones is 9 ones. The 4 remaining tens subtract 3 tens gives 1 ten. 7 hundreds subtract 8 hundreds we can not do so exchange 1 thousand for 10 hundreds. 17 hundreds subtract 8 hundreds gives 9 hundreds. The 3 remaining thousands subtract 2 thousands leaves 1 thousand.   Once children have a secure conceptual understanding of subtracting whole numbers, they move onto the formal written method.  As with previous methods, children's place value knowledge is reinforced through the modelling of this method. With examples carefully structured to support conceptual understanding. 
Subtract numbers with up to 2 decimal places using the formal written method of subtraction In order to begin to subtract decimal numbers children progress carefully through concrete, pictorial and abstract method. Note – as part of calculation, children are taught to estimate the answer to a calculation and use the inverse to check answers.	Children use place value counters (and/or base ten) to begin subtracting decimal numbers. Including examples which have different amounts of digits. Examples are carefully structured beginning with questions that do not require exchange. When modelling this method children's place value knowledge is reinforced. Using the examples (right):   7 hundredths minus 4 hundredths is 3 hundredths. We can not do 4 tenths subtract 7 tenths and therefore we exchange 1 one for the 10 tenths which allow us to subtract 7 tenths. We can then subtract 2 ones from the 5 remaining units leaving 3 ones. Children use visual maths to subtract numbers with up to two decimal places including numbers which have different amounts of digits. They use place holders where necessary.  Examples are carefully structured beginning with questions that do not require exchange. When modelling this method, children's place value knowledge is reinforced. E.g. 3 hundredths take away 1 hundredth.  Once children have a secure conceptual understanding of subtraction of decimals, they move onto a formal written method.  As with previous method, children's place value knowledge is reinforced through the modelling of this method. 

Calculation Policy Year 4

NC statement and guidance	CPA
Multiply a two-digit and a three-digit number by a one-digit number Children move on and secure method taught in Year 3 moving on to multiplying a three-digit number by a one-digit number. Note - as part of calculation, children are taught to estimate the answer to a calculation and use the inverse to check answers.	Prior to this method, multiplication may be modelled using base ten equipment to begin initial conceptual understanding. Place value counters are then used. In the example above, 3 groups of 224 have been drawn. It is recognised that there are more than 10 ones and therefore 10 ones are regrouped to make 1 ten in the tens column. Examples are structured carefully beginning with those that do not require regrouping.  Children then move onto a pictorial representation. In the example (right), 3 groups of 224 have been drawn. Children then use their addition skills to find the total.  Examples are structured carefully beginning with those that do not require regrouping. Children then move onto a formal written method.  They begin with an expanded method moving into the short method of multiplication.  Examples are structures carefully beginning with those that do not require regrouping.
Divide a three-digit number by a one-digit number Progressing from Year 3, Year 4 bridge the gap between dividing a two-digit number by a one digit number and dividing a four-digit numbers by a one digit number. It is important that children progress carefully between concrete, pictorial and abstract methods. Note - as part of calculation, children are taught to estimate the answer to a calculation and use the inverse to check answers.	Prior to this method, division may be modelled using base ten equipment. Place value counters are used to represent the three-digit number.  Beginning in the hundreds column, the required amount of groups are then made (above). Starting in the hundreds column groups of 3 are made. When making groups of 3 in the tens columns there is 1 ten left over which is exchanged into the ones column. The 12 ones are then made into groups of 3. Examples are structured carefully beginning with those that do not have remainders. Once secure in the concrete method, children move onto a pictorial method by drawing the three-digit number that they are dividing. Beginning in the hundreds column, the required amount of groups are then made (right).  Examples are structured carefully beginning with those that do not have remainders. Finally, children move onto the formal written method first beginning with informal jottings.  The same place value conversations are modelled as in the previous methods. Examples are structured carefully beginning with those that do not have remainders. 
Add and subtract fractions with the same denominator Children progress into adding and subtracting fractions with the same denominator which go above a whole.	Children begin adding and subtracting fractions with same denominator using fraction bars  As seen in the first example children draw 5/7s. They then shade in 6 more - they will recognise that in order to do this they would have to draw another fraction bar. Once the bar is drawn children can find a total. When subtracting children begin by shading the correct amount. They then cross out the required number and count the remainder.  Once secure, children move onto using a more abstract method.  Children recognise that when adding and subtracting fractions with the same denominator the denominator stays the same (as the sizes of the pieces are the same) we can then add or subtract the numerators. 

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
Autumn 1	Previous misconception	**Number and Place Value** Identify, represent and estimate numbers using different representations Recognise the place value of each digit in a four-digit number [Key] round any number to the nearest 10, 100 or 1000 [Key] count in multiples of 25 and 1000 FROM SPRING Find 1000 more a less than a given number AMM link - Unit 1 (lessons 1-9) not all covered by AMM		**Addition and subtraction** Add and subtract numbers with up to 4 digits using formal written methods of columnar addition and subtraction where appropriate AMM link - Unit 2 (lessons 1-10)		Test week	Consolidation week	
Autumn 2	**Multiplication and division** [Key] Recall multiplication and division facts for multiplication tables up to 12x12 (including from Number and place value - [Key] count in multiples of 6, 7, 9) Use place value, known and derived facts to multiply mentally, including: multiplying by 1 and 0 and multiplying together three numbers Recognise and use factor pairs and commutativity in mental calculations. AMM link - Unit 3 (lessons 1-9) not all covered by AMM		**Measure** Read, write and convert time between analogue and digital 12- and 24- hour clocks Measure and calculate the perimeter of a rectilinear figure (including squares) in cm and m. AMM link - Unit 7 (lessons 1-2) And AMM link - Unit 9 (lessons 1-3)	**Shape and Position** [Key] Compare and classify geometric shapes, including quadrilaterals and triangles based on their properties and size AMM link - Unit 11 (lessons 6-9)	**Fractions** [Key] Recognise and show, using diagrams, families of common equivalent fractions. Add and subtract fractions with the same denominator AMM link - Unit 6 (lessons 1-16)		

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
Spring 1	**Number and Place Value** FROM AUTUMN [Key] order and compare numbers beyond 1000 [Key] count backwards through zero to include negative numbers Solve number and practical problems that involve ordering and exploring negative numbers within increasingly larger positive numbers AMM link - Unit 13 (lessons 3-4) not all covered by AMM	**Addition and subtraction** [Key] solve addition and subtraction two-step problems in context, deciding which operation and methods to use and why AMM link - Unit 2 (lessons 11-13)	**Multiplication and division** Use place value, known and derived facts to divide mentally, including: dividing by 1 FROM AUTUMN Multiply two-digit and three-digit numbers by a one-digit number using written layout FROM AUTUMN Divide two-digit and three-digit numbers by a one-digit number using formal written layout Solve problems involving multiplying and adding including use the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n object are connected to m objects. AMM link - Unit 3 (lessons 10-19) not all covered by AMM		**Statistics** Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs [Key] solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs AMM link - Unit 4 (lessons 1-4) Pictogram and Bar chart focus	Test week	- -	- -
Spring 2	Consolidation week	**Shape and Position** FROM AUTUMN [Key] Identify lines of symmetry in 2D shapes presented in different orientations. FROM AUTUMN Complete a simple symmetric figures with respect to a specific line of symmetry AMM link - Unit 11 (lessons 11-13)	**Fractions (and Decimals)** Solve problems involving increasingly harder fractions to calculate quantities, including non-unit fractions where the answer is a whole number Recognise and write decimal equivalences of any number of tenth FROM SUMMER Compare numbers with the same number of decimal places up to one decimal place FROM SUMMER [Key] Round decimals with one decimal place to the nearest whole number AMM link - Unit 6 (lessons 18-20) And AMM link - Unit 8 (lessons 1-5)		**Measure** Find the area of rectilinear shapes by counting squares Measure and calculate the perimeter of composite shapes [Key] convert between different units of measure AMM link - Unit 9 (lessons 4-10) And AMM link - Unit 10 (lesson 1-4)		- -	- -

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Summer 1	**Number and Place Value** Read Roman numerals to 100 (I to C) and know that over time, the number system changed to include the concept of zero and place value AMM link - Unit 13 (lessons 1-2)	**Addition and subtraction** FROM SPRING Estimate and use inverse operations to check answers to a calculation AMM link - not covered by AMM	**Multiplication and division** [Key] Continue to recall multiplication and division facts for multiplication tables up to 12x12 AMM link - Unit 5 (lessons 1-4)	**Shape and Position** Describe positions on a 2D gird as coordinates in the first quadrant Describe movements between positions as translations of a given unit to the left/right and up/down [Key] Plot specified points and draw sides to complete a given polygon AMM link - Unit 12 (lessons 1-5)	**Measure** [Key] convert between different units of measure FROM SPRING Estimate, compare and calculate different measure including money in £ and p AMM link - Unit 7 (lessons 3-5) And AMM link - Unit 10 (lessons 6-14)		- -	- -
Summer 2	**Statistics** Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs [Key] solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs AMM link - Unit 4 (lessons 6-9) time graph focus	Test week	Consolidation week	**Fractions (and Decimals)** Recognise and write decimal equivalences of any number of hundredth Recognise and write decimal equivalences to ¼, ½, ¾ 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. [Key] Count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten And AMM link - Unit 8 (lessons 6-15)		**Shape and Position** FROM SPRING Identify acute and obtuse angles and compare and order angles up to two right angles by size. AMM link - Unit 11 (lessons 1-4) AMM link - Unit 13 (lesson 1-4)	**Year 5 prep** AMM link - Unit 13 (lessons 6-9)	