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Year 3 LTP Maths

Year 3 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.

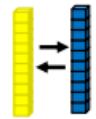
Make use of **PD videos** on unit pages and Progression in Calculations page.

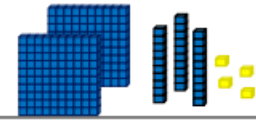
Explore the guidance for Year 3 representations.

Dienes equipment

An important resource for demonstrating the relative size of place value columns. Supports the process of **regrouping** – one ten is equal to ten ones, one hundred is equal to ten tens and so on. Can also be used to represent addition and subtraction with 2- and 3-digit integers.

One ten is regrouped for ten ones. Ten ones is regrouped for one ten.

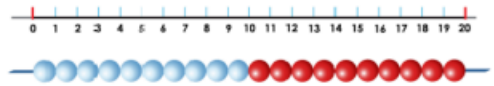


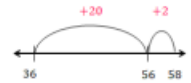


234 is two hundreds, three tens and four ones. I can represent subtracting 20 by removing two ten sticks.

Number lines

Number lines can be used to represent and compare numbers and can be used alongside a bead string. They demonstrate 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. Pupils will have experienced this most through adding tens then ones as shown. The use of number lines is extended during Year 3.





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:

$38 = 25 + 13$

$\square = 37 + 44$

$12 \div \square = 4$

Number bond knowledge

Pupils should be increasingly fluent in number bond recall for all numbers to 20. Make use of transitions and Maths Meetings to develop this.

$17 = 12 + 5$

$17 = 11 + 6$

$17 = 10 + 7$

Deriving facts

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

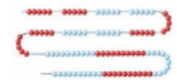
If I know $12 + 5 = 17$ *then* $22 + 5 = 27$.

If I know $12 + 5 = 17$ *then* $17 - 12 = 5$

If I know $17 - 12 = 5$ *then* $37 - 12 = 25$

Bead strings

Bead strings help support the ordinality of number. They are repurposed e.g. beads have the value 101-200 for representation when rounding.



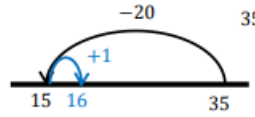
The 'make 10' strategy

Pupils apply number bonds to 10 to calculate how many more/less to the next multiple of ten. They partition the part into two parts to calculate mentally. Using concrete or pictorial representations can scaffold thinking.

$36 + 27 = ?$ *I can partition 27 into 4 and 23. 36 plus 4 is equal to 40. 40 plus 23 is equal to 63.*

Round and adjust

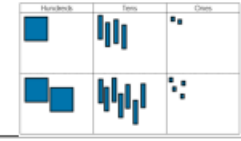
Pupils apply understanding of ordinality of number, recognising when a part or whole is close to a multiple of 10 e.g. 29, 32. They round before calculating, then adjust their answer accordingly. Concrete or pictorial models are used to represent this.



$35 - 19 = 16$

Place value charts

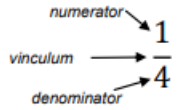
Place value charts have been used to represent two-digit numbers and can be used alongside concrete, pictorial and abstract representations of number to secure understanding of the positional aspect of the number system. Pupils have made use of place value charts when adding two 2-digit numbers and their use is extended in Year 3.



Representing fractions

A range of concrete and pictorial representations are 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 should be familiar with a range of representations.

One of four equal parts.

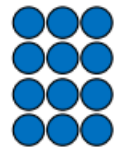


One quarter of 12 is three.

One quarter of a metre is 25 cm.

Arrays

Concrete and pictorial arrays demonstrate the **commutativity** of multiplication and **inverse relationship** of multiplication and division. Pupils should be familiar with considering rows and columns. **Part-whole language** may be used alongside.

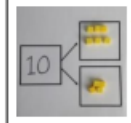


There are four parts/groups each with a value of three. The whole is 12. Four multiplied by three is equal to 12.

The whole is 12. There are three parts/groups each with a value of 4. 12 divided by three is equal to four. One third of 12 is equal to four.

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**.

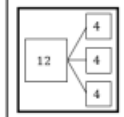


The whole is ten. One part is six and one part is four. Six plus four is equal to ten.

By moving the manipulatives the model represents subtraction.

The whole is ten. I subtract one part of six. The missing part is four. Ten subtract six is equal to four.

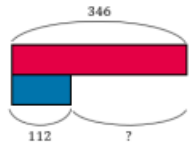
Multiplication, division and fractions of quantities can be represented using multiple equal parts.



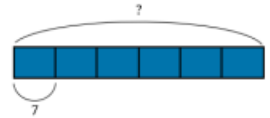
There are three equal parts with a value of four. The whole is 12. Three multiplied by four is equal to 12.
12 divided into three equal parts is equal to four.
One third of 12 is four.

Bar models

Pictorial bar models and concrete Cuisenaire as bar models are used throughout the year and represent **part-whole relationships** and **knowns and unknowns** within problems. 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 7 and there are 6 equal parts. The whole is unknown.

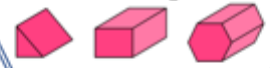
$7 \times 6 = 42$

Year 3 Maths Vocabulary

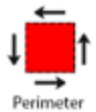
Acute Angle
An angle smaller than a right angle

Axis / Axes
A real or imaginary reference line. The y-axis and x-axis on charts/graphs show scales or labels for variables

Prism
A 3D solid with two identical, parallel bases and otherwise rectangular faces

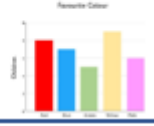


Perimeter
The perimeter of a 2D shape is the total distance around its exterior



Roman Numeral
A system of symbols used to represent numbers developed and used by the Romans

Bar Graph
A representation of data in which the frequencies are shown by the height or length of the bars.



Numeral
A numeral is a symbol (or group of symbols) used to represent a number

Whole numbers can all be represented as numerals consisting of the digits 0 to 9

Product
The result you get when you multiply two numbers

24 is the product of 3 and 8

Place Holder
A place holder is a zero used in any place value column (that contains a value of zero) to clarify the position of digits in other places

A place holder is used to make it clear my number is 320, not 32

Horizontal
Referring to planes and segments that are parallel to the horizon

The x-axis on a graph should be horizontal

Perpendicular
A pair of line segments are perpendicular if they intersect or form a right angle

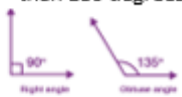
Round
Approximate a number, normally to the nearest multiple of 10 to make it easier with which to calculate

I would round 17 to 20 as it is 3 from 20 but is 7 away from 10

Factor
A number, that when multiplied with one or more other factors makes a given number

The number six has four factors: 1, 2, 3 and 6

Obtuse Angle
An angle that is greater than a right angle but less than 180 degrees

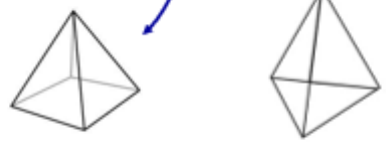


Regular
Regular polygons have angles that are all equal and side lengths that are all equal.

Irregular
A term used to describe a shape that is not regular

The sides and angles of this pentagon are not all equal so it is irregular

Square/ Triangle Based Pyramid
A pyramid is a 3D shape with a 2D shape as its base and triangular faces that taper to a point called a vertex or apex



Kilometre
A metric unit of length that is equal to 1000 metres

The distance from school to Chloe's house was exactly one kilometre (1km)

Parallel
Line segments that are parallel must be on the same plane and will never meet

Millimetre
A metric unit of length that is equal to one thousandth of one metre

The length of Nigel's ruler is 300 millimetres (300mm)

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Calculation Policy Year 3

NC statement and guidance

Use the formal written method of addition to add numbers with up to three digits.

Children make the transition to formal written methods of calculation. Children need to have secure conceptual understanding of concrete and pictorial methods in order to do this. Note – as part of calculation, children are taught to estimate the answer to a calculation and use the inverse to check answers.

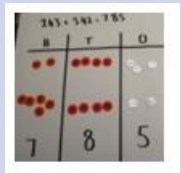
Use the formal written method of subtraction to subtract numbers with up to three digits.

Children make the transition to formal written methods of calculation. Children need to have secure conceptual understanding of concrete and pictorial methods in order to do this. Note – as part of calculation, children are taught to estimate the answer to a calculation and use the inverse to check answers.

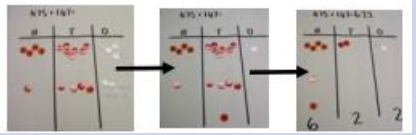
CPA

Prior to using place value counters, children may use base ten (see Year 2) to help support their understanding.

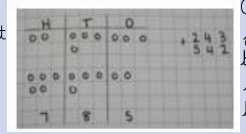
Children begin addition by calculating examples that do not require them to cross the tens boundary.
Each number is represented in the place value grid before children find the total starting in the ones column.



Children progress to questions which require regroupings. It is recognised that there are more than ten ones therefore children group together ten and regroup them to make one ten in the tens column. It is then recognised that there are more than 10 tens which are regrouped to make a hundred.
Children then count what remains to find their answer.
Note: when teaching this method progress carefully through the level of regrouping required.



Children begin addition by calculating examples that do not require them to cross the tens boundary. Each number is represented in the grid before children find the total starting in the ones column.



Children progress to questions which require regrouping. It is recognised that there are more than ten ones therefore children group together ten and regroup them to make one ten in the tens column. It is then recognised that there are more than 10 tens which are regrouped to make a hundred. This can be seen with jottings.
Children then count what remains to find their answer.
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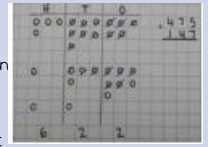
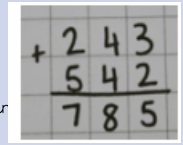
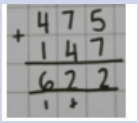


Children finally progress onto a formal written method of addition beginning with examples that do not require them to cross the tens boundary. The pictorial representation and the abstract representation are modelled alongside each other to develop conceptual understanding. Examples are taught where children need to use their place value knowledge to line up digits correctly.

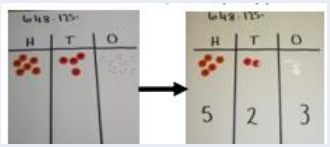


Children progress to questions which require regrouping. It is recognised that there are more ten ones therefore children group together ten and regroup them to make one ten in the tens column (seen to the right). It is then recognised that seven tens and four tens make eleven tens altogether leaving one ten in the tens column regrouping the ten tens into the hundred column. This can be seen in the jottings. Note: when teaching this method progress carefully through the level of regrouping required.

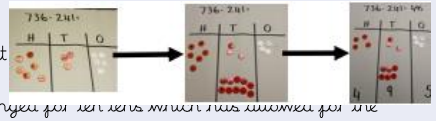


Prior to using place value counters, children may use base ten (see Year 2) to help support their understanding.

Children begin subtraction by calculating examples that do not require them to exchange.
Each number is represented in the place value grid before children find the answer starting in the ones column.

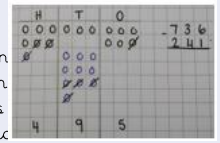


Children progress to questions which require exchange. It is recognised that they are to subtract one from the ones column but unable to subtract 4 tens from the tens column.
One hundred has been exchanged for ten tens which has allowed for the subtraction of the four needed. Two hundreds are then subtracted.
Children then count what remains to find their answer.
Note: when teaching this method progress carefully through the level of exchanged required.

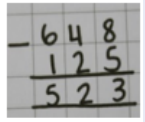


Children begin subtraction by calculating examples that do not require them to exchange.
Each number is represented in the place value grid before children find the answer starting in the ones column.

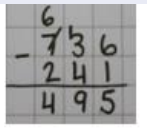
Children progress to questions which require exchange. It is recognised that they are able to subtract one from the ones column but unable to subtract 4 tens from the tens column. One hundred has exchanged for ten tens which has of the four needed. two hundreds are then subtracted.
This can be seen in the crossings out above.
Children then count what remains to find their answer.
Note: when teaching this method progress carefully through the level of exchange required.



Children finally progress onto a formal written method of subtraction beginning with examples that do not require them to exchange. The pictorial representation and the abstract representation are modelled alongside each other to develop concep understanding. Examples are taught where children need to use their place value knowledge to line up digits correctly.



Children progress to questions which require exchange. It is recognised that one unit can be subtracting from six units to leave five. Four hundreds can not be taken from three hundreds and so one hundred is exchanged for ten tens which can be seen in the jottings above. Children may then do six hundreds take away two hundreds leaving four. This can be seen in the jotting example. Note: when teaching this method progress carefully through the level of regrouping required.



Calculation Policy Year 3

NC statement and guidance

Write mathematical statements using multiplication facts they know including multiplying two-digit number by a one-digit number.

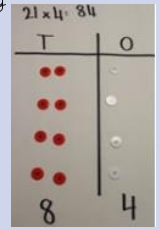
Children make the transition to formal written methods of calculation. Children need to have secure conceptual understanding of concrete and pictorial methods in order to do this. Note - as part of calculation, children are taught to estimate the answer to a calculation and use the inverse to check answers.

Dividing a two-digit number by a one-digit number progressing into formal methods.

Children make the transition to formal written methods of calculation. Children need to have secure conceptual understanding of concrete and pictorial methods in order to do this. Note - as part of calculation, children are taught to estimate the answer to a calculation and use the inverse to check answers.

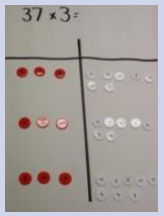
CPA

Children may begin by using base ten to develop conceptual understanding before moving on to use place value counters.

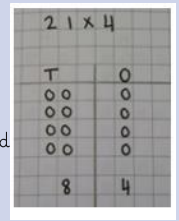


Children make the number of groups in their place value grid. In this case, 4 groups of 21.
Similar to addition they add the ones and the tens to find the total.

Children move onto multiplication which require them to regroup.
Children make three groups of 37 in their place value grid.
They use their addition skills to find the total.



Children move on to a pictorial representation of the concrete method.
As seen in the example (right), children make the number of groups in their place value grid.
Similar to addition they add the ones and the tens to find the total.



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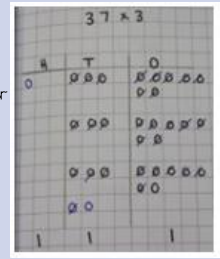
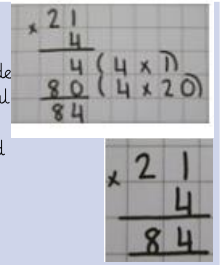
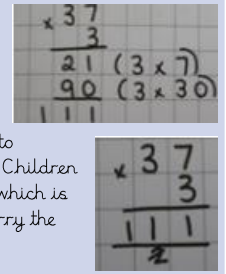
They use their addition skills to find the total.



To support progression into a formal method, children first use an expanded written method. This is modelled alongside the pictorial method to support conceptual understanding. Once children are secure, they move onto the formal written method below.

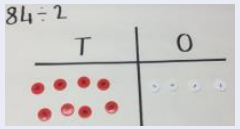


To support progression into a formal written method, children first use an expanded written method. This is modelled alongside the pictorial method to support conceptual understanding. Once children are secure, they move onto the formal written method on the right. Children will need to recognise that 3 x 7 = 21 which is two tens and one unit and therefore carry the two tens across.

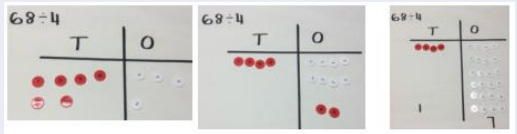


Children may begin by using base ten to develop conceptual understanding before moving on to use place value counters.

Children make the correct number in the place value grid. They group the 8 tens into groups of 2 and the 4 ones into groups of 2. There are 4 groups of ten and 2 groups of ones.

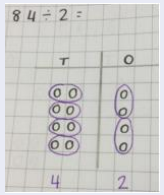


Children move into examples where they need to regroup.
Children make the correct number in the place value grid. They group the 6 tens into groups of 4. They can only make one group of 4 with two left over. They exchange these two tens into ones column. They group to 28 ones into groups of 4 giving 7 groups.

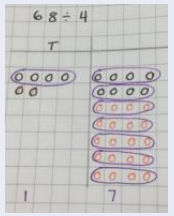


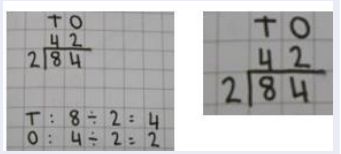
Children move onto pictorial method.

They draw 82 into their place value grid. They group the 8 tens into groups of 2 giving 4 groups and the 4 ones into groups of 2 giving 2 groups.

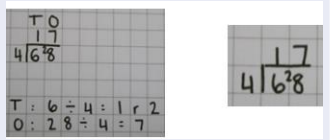


Children move onto examples where they need to regroup. They draw 68 into their place value grid. They group 6 tens into groups of 4. There is 1 group with 2 tens left over which they exchange into the ones column (in orange). The 28 28 ones are then grouped into groups of 4 giving 7 groups.

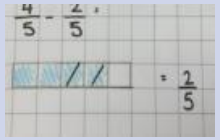
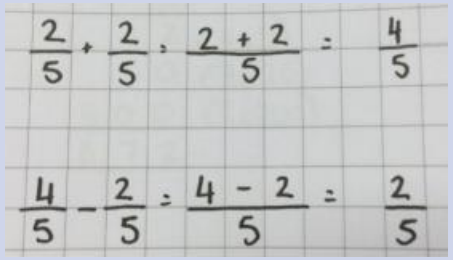




Children move onto an abstract method, initially making informal jottings to support as seen in the examples on the left.



Calculation Policy Year 3

NC statement and guidance	CPA
Add and subtract fractions with the same denominator Children begin to look at addition of fractions through pictorial method established in other fraction areas of learning.	Children begin adding and subtracting fractions with the same denominator using fraction bars. As seen in the first example children draw 2/7s. They then shade in 3 more to give a total of 5/7. 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** [Key] Count from 0 in multiples of 50 and 100 [Key] Recognise the place value of each digit in a three-digit number [Key] Find 10 or 100 more or less than a given number Read and write numbers up to 1000 in numerals and in words FROM SPRING Compare and order numbers up to 1000 AMM link - Unit 1 (lessons 1-5) And Unit 2 (lessons 1-4)		**Addition and Subtraction** [Key] Add and subtract numbers mentally, including three-digit numbers and ones [Key] Add and subtract numbers mentally, including three-digit numbers and tens [Key] Add and subtract numbers mentally, including three-digit numbers and hundreds AMM link - Unit 1 (lessons 7-13) And Unit 4 (lessons 1-5)		Test week	Consolidation week	- -
Autumn 2	**Multiplication and Division** [Key] Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables [Key] Begin to 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 into formal written methods AMM link - Unit 6 (lessons 1-9)		**Fractions** [Key] Recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10 [Key]] Count up and down in tenths [Key] Recognise, find and write fractions of a discrete set of objects: unit fractions FROM SPRING Recognise and use fractions as numbers: unit fractions AMM link - Unit 9 (lessons 1-5) not all covered by AMM	**Measure** Measure the perimeter of simple 2D shapes [Key] Measure, compare, add and subtract lengths (m, cm, mm) [Key] Add and subtract amounts of money to give change, using both £ and p in practical contexts AMM link - Unit 5 (lessons 1-9) And Unit 1 (lesson 14)		**Shape and Position** Draw a 2D shapes and make 3D shapes using modelling materials Recognise 3D shapes in different orientations and describe them AMM link - Unit 10 (lessons 10-13)	

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
Spring 1	**Number and Place value** [Key] Solve number problems and practical problems involving working with and estimating numbers up to 1000 in a variety of units Solve one-step and two questions using information presented in bar charts and tables AMM link - Unit 2 (lessons 5-9)	**Addition and Subtraction** FROM AUTUMN Add and subtract numbers with up to three-digit, using formal written methods of columnar addition and subtraction Solve problems including missing number problems, using number facts, place value and more complex addition and subtraction FROM SUMMER estimate the answer to a calculation and use inverse operations to check answers AMM link - Unit 4 (lessons 7-14) not all covered by AMM		**Fractions** FROM AUTUMN [Key] Recognise, find and write fractions of a discrete set of objects: non-unit fractions Compare and order unit fractions and fractions with the same denominator Recognise and use fractions as numbers: non-unit fractions AMM link - Unit 9 (lessons 6-9)	**Statistics** FROM AUTUMN [Key] Interpret and present data using pictograms, bar charts and tables Solve one-step and two questions using information presented in pictograms, bar charts and tables AMM link - Unit 3 (lessons 1-3) pictogram and bar chart focus - not all covered by AMM	Test week	- -	- -
Spring 2	Consolidation week	**Multiplication and Division** FROM AUTUMN [Key] Continue to 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 into formal written methods AMM link - Unit 7 (lessons 1-11)		**Measure** FROM AUTUMN estimate and read time with increasing accuracy to the nearest minute. Use vocabulary such as o'clock, am/pm, morning, afternoon, noon and midnight Read and compare time in terms of seconds, minutes and hours. [Key] Tell and write the time from an analogue clocking including using Roman numerals from I to XII, and 12-hour and 24- hour clocks AMM link - Unit 8 (lessons 1-9) not all covered by AMM		**Shape and Position** Recognise angles as a property of shape (a description of a turn) [Key] Identify right angles, recognise that two right angles make a half turn, three make three quarts of a turn and four make a complete turn [Key] Identify whether angles are greater than or less than a right angle AMM link - Unit 10 (lessons 1-4)	- -	- -

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
Summer 1	**Number and Place Value** Revisit and apply based on gaps in learning AMM link - not covered by AMM	**Addition and Subtraction** Revisit - solve problems, including missing number problems, using number facts, place value and more complex addition and subtraction AMM link - not covered by AMM	**Multiplication and Division** FROM SPRING Solve problems, including missing number problems involving multiplication and division, including positive integer scaling problems and correspondence problems ion which n objects are connected to m objects AMM link - Unit 7 (lessons 13-14) And Unit 12 (lessons 1-4) not all covered by AMM		**Fractions** FROM SPRING [Key] recognise and show, using diagrams, equivalent fractions with small denominators FROM SPRING Add and subtract fractions with the same denominator within one whole Solve problems that involve understanding of fractions AMM link - Unit 9 (lessons 11-14) not all covered by AMM	**Statistics** FROM AUTUMN [Key] Interpret and present data using bar charts, tables and tables FROM SPRING Solve one-step and two questions using information presented in bar charts, pictograms and tables AMM link - Unit 3 (lessons 4-5)	- -	- -
Summer 2	**Measure** Know the number of seconds in a minute and the number of days in each month, year and leap year Compare duration of events AMM link - not covered by AMM	Test week	Consolidation week	**Measure** FROM AUTUMN [Key] add and subtract (solve problems) based on mass and capacity AMM link - Unit 11 (lessons 9-14)	**Shape and Position** Identify horizontal and vertical lines and pairs of perpendicular and parallel lines AMM link - Unit 10 (lessons 6-8, 14)	Consolidation week	**Year 4 Prep - Number and place value/ Addition and subtraction/Multiplication and Division revision** FROM SPRING Identify, represent and estimate numbers using different representations Revisit - solve problems including missing number problems using number facts, place value AMM link - Unit 13 (lessons 1-10)	