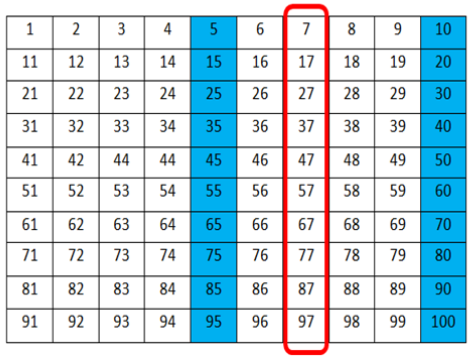
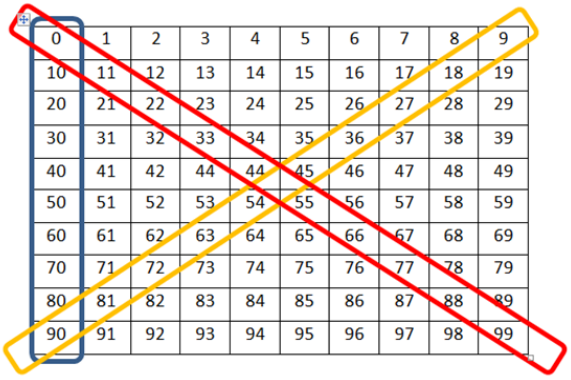
Number and number processes

Terms	Illustrations	Definitions
100 Square	 Blue = counting in multiples of 5 – illustrates that all multiples of 5 end in either a 5 or a 0 Red = sequence of adding 10 (applies to vertical rows) These are just 2 examples, many more patterns can be found within this grid.  Blue = counting in 10's from 0 Red = 11 times table Orange = 9 times table These are just 3 examples, many more patterns can be found within this grid.	A square showing numbers from either 0-99 or 1-100. Used to help with the four operations - addition, subtraction, multiplication and division. It can also be used to show a variety of patterns and sequences in numbers e.g. counting in 10's in the vertical rows or the pattern involved in counting in 5's (all multiples end in 0 or 5) etc.

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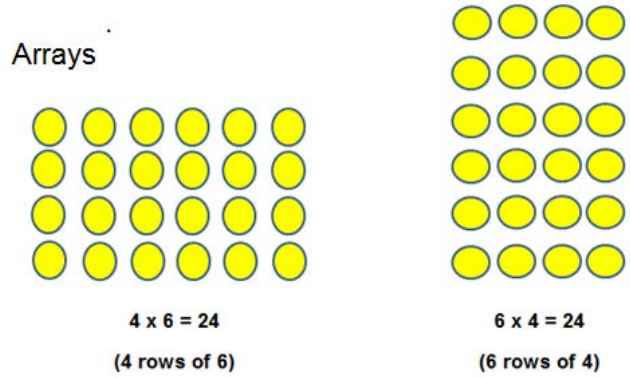
Addition		To find the total of more than one amount, *e.g. 14 + 10 = 24* Addition is the inverse operation of **subtraction.** e.g. 350 + ☐ = 400 could be solved by asking 400 - ☐ = 350
Algorithms		An algorithm is a step by step procedure used to carry out a calculation. For example: 24 x7 = 168 or 6) 9 1 8 = 153 2
Arrays		Used to identify quantities and patterns to make quick estimates *e.g. 2 rows of 5 dots recognised as 10.* Used to help calculate or check multiplication problems *e.g. 24 can be shown as 4 rows of 6 or 6 rows of 4.*

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Associative law		It doesn't matter how you group the numbers when adding or multiplying. *e.g. (6 + 3) + 4 = 6 + (3 + 4) or (2 × 4) × 3 = 2 × (4 × 3)*
Cardinal number or 'Cardinality'		The number given to the total amount of items in a set. *e.g. there were 14 people in the hall – 14 is the cardinal number*
Commutative law		Numbers can be swapped around (within a calculation) when adding and multiplying and still get the correct answer. *e.g. 4 + 3 is the same as 3 + 4, 4 x 8 = 8 x 4*
Composite number		A whole number that can be divided evenly by numbers other than 1 or itself. *E.g. 9 can be divided evenly by 3 (as well as 1 and 9), so 9 is a composite number.*
Consecutive number		Numbers next to one another in numerical order. *e.g.* • *5 and 6* • *4.2 and 4.3*

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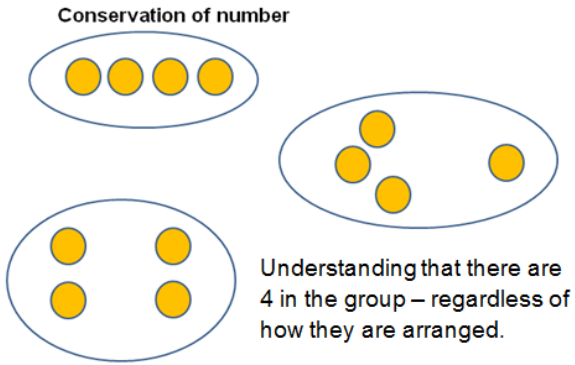
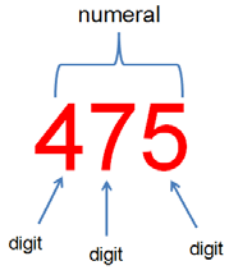
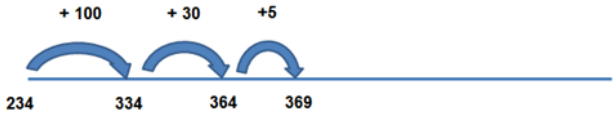
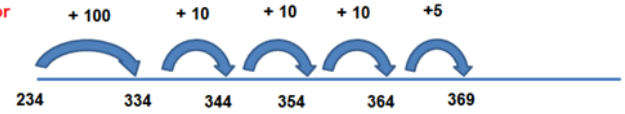
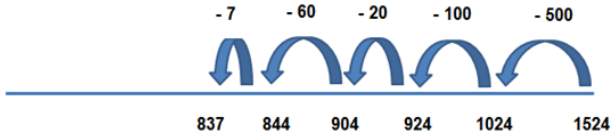
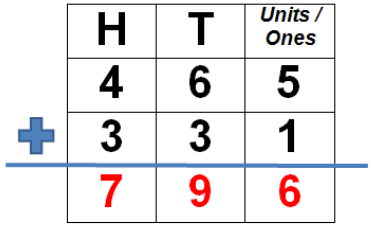
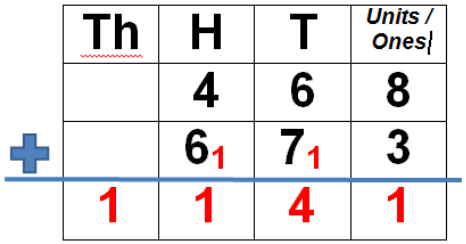
Conservation of number		Understanding that the quantity of a set does not change due to how they are arranged. *e.g. in a group or in a row = same amount.*
Digit		The symbols used to make numerals (numbers). 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9 are the ten digits used in our number system. E.g. the numeral 153 is made up of 3 digits ("1", "5" and "3").
Distributive law	$3 \times 2 + 3 \times 4 = 3 \times (2+4)$	Multiplying a number by a group of numbers added together is the same as doing each multiplication separately. *e.g. 3 lots of (2+4) is the same as 3 lots of 2 plus 3 lots of 4*
Division		Division is the process used to share a quantity or set of items. *For example sharing 30 grapes between 5 children gives each child 6 grapes.* *30 ÷ 5 = 6*

		Division is the inverse operation of **multiplication** *e.g.* *100 divided by 10 could be answered by asking 10 x* ☐ *= 100.*
Double facts		Used to quickly learn and recall addition facts. *e.g. double 4 is 8, double 5 is 10, double 6 is 12 etc.*
Empty number line	**234 + 135**  or  This is two examples of a method which can be used to solve the calculation but there are other methods. **1524 - 687**  This is an example of a method which can be used to solve the calculation but there are other methods.	A number line which can have any starting number to add or subtract a number in steps that the learner finds comfortable. See the picture here for how 234 add 135 can be broken up in to steps to make the calculation more manageable. Another example is shown of a subtraction problem. They can also be used for multiplication and division.

Even number		A number which can be divided equally by 2 *e.g. 0, 2, 4, 16, 28 etc.*
Formal Written Algorithm	 **Simple formal addition algorithm example 1:** • Add the units (ones) first • Add the tens • Add the hundreds  **More complex formal addition algorithm example 2:** • Add the units (ones) first. 8 + 3 = 11 so you need to put 10 in to the tens column and keep the one/unit in the units/ones column • Add the tens. 60 + 70 + 10 = 140 so you need to put the 1 hundred in to the hundreds and keep the 4 tens in the tens column (40 written as 4 as we know it is 4 tens as it is in the tens column) • Add the hundreds. 400 + 600 + 100 = 1100 so you need to put the 1 thousand in to the thousands column and keep the 1 hundred in the hundreds column (100 written as 1 as we know it is 1 hundred as it is in the hundreds column)	A standard written method to calculate problems involving addition, subtraction, multiplication and division. These should only be introduced when learners are confident in calculating a variety of problems mentally. Can also be known as 'standard written algorithm'. Here are some examples of formal written algorithms for addition and subtraction.

	H	T	*Units / Ones*
	6	8	5
−	4	2	3
	2	6	2

Simple formal subtraction algorithm example 1:

- Subtract the units (ones) first
- Subtract the tens
- Subtract the hundreds

	Th	H	T	*Units / Ones*
	~~4~~ ^{3}	^{1}4	~~6~~ ^{5}	^{1}8
−	2	6	5	9
	1	8	0	9

More complex formal standard algorithm example 2:

- Subtract the units/ones. 8 – 9 cannot be done in a formal written algorithm without having to exchange a ten for 10 units/ones.
- 1 ten is exchanged from the tens column into 10 units, then given to the units/ones column. This now makes the units/ones column as 18 – 9 = 9. The tens column now has 5 tens (50).
- Subtract the tens.
- Subtract the hundreds. 400 - 600 cannot be done in a formal written algorithm without having to exchange 1 thousand for 10 hundreds.
- 1 thousand is exchanged from the thousands column to 10 hundreds, then given to the hundreds column. This now makes the hundreds column as 1400 – 600 = 800. The thousands column now has 3 thousands in it (3000).
- Subtract the thousands column.

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Formulae		A formula is a special type of equation that shows the relationship between different variables. Using a formula is the most efficient way of solving problems that compare different sets of variables. *E.g. Area of rectangle = length x breadth, Volume of a cuboid = l x b x h*
Integers		Integers are whole numbers, but they also include negative numbers and zero *e.g. -2, -1, 0, 1, 2*
Mental agility		The ability to calculate problems mentally with speed, efficiency, accuracy in a variety of ways. Recall of number facts is important in being able to calculate quickly, as is mental jottings (writing down numbers to help track the calculation without using a written algorithm.) The preferred method is often selected until the learner has developed confidence in identifying the most efficient method.
Modelling		Generating a **number sequence** using a physical or pictorial pattern and working out the equation that the sequence represents. Formulae is used to find information about the items at any position in the sequence.
Multiplication		To find the **product** of more than one amount *e.g. 4 x 3 (find 4 lots of 3).* Multiplication is the inverse operation of division *e.g.* *10 x ☐ = 60 could be answered by asking 60 ÷ ☐ = 10.*
Near doubles		These facts are learned once 'double facts' are learned. *E.g. To quickly answer 8 + 7, the learner can recall double 8 as 16 then minus 1 or recall double 7 as 14 and add 1.*

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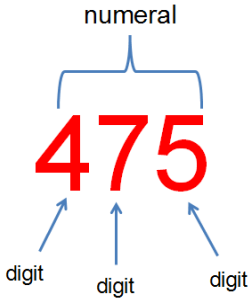
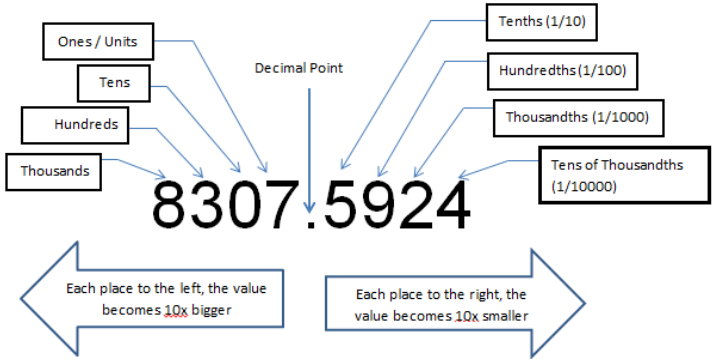
Negative numbers		Numbers which are less than zero. *e.g. -1, -2, -3 etc.*
Number bonds		The different pairs of numbers which make up the same number *e.g. the number bonds for 10 are 1+9, 2+8, 3+7, 4+6 and 5+5.* Learners try to learn these facts to help them with quick mental calculations.
Numeral		A symbol that represents a number. Digits make up numbers. *e.g. 3, 49 and twelve are all numerals.*
Odd number		A number which cannot be divided equally by 2 e.g. 1,3,5,7 etc
One to one correspondence		When counting, each object must be counted only once and as the number name is identified.
Order of operations		A set order of operations used within calculations involving more than one operation *e.g. + and x.* The use of mnemonics such as BODMAS, BIDMAS and BOMDAS are often used when deciding on the order of operations. BODMAS = Brackets first, orders next (e.g. powers and roots), division and multiplication then addition and

		subtraction. BIDMAS = Brackets first, indices next, division and multiplication then addition and subtraction. BOMDAS = Brackets Of Multiplication Division Addition Subtraction.
Ordinal number		Describes a position within an ordered set *e.g. first, second, third, fourth etc.*
Partitioning		To split a number into component parts. *E.g. 10 can be 6 + 4, 5 + 5 etc. These can also be known as 'number stories' or 'number bonds'.* To split a number into component parts *e.g. at First level; 38 can be partitioned into 30 + 8 or 19 + 19, or at Second level; 17 x 17 can be partitioned in to 17 x 10 and 17 x 7.*
Place Value		Understand zero is equal to no amount How a number is made up and its relationship to other numbers. It is the place of each of the digit or digits which makes a difference to the value of the whole number *e.g. 324 – the 2 is equal to 20 whereas in 234, the 2 is equal to 200.* How a number is made up and its relationship to other numbers. It is the place of each of the digit or digits which makes a difference to the value of the whole number and decimal fractions *e.g. at Second level; 10.05 is smaller than 10.50.*
Product		The results of multiplying 2 or more numbers together (only applies in multiplication) *e.g. 10 is the product of 5 x 2.*

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Real numbers		All points on an infinitely long number line, *e.g. fractions, decimal fractions, roots, π etc.*
Remainder		The amount "left over" after completing a division calculation. *e.g. 23 divided by 5 would be 4 remainder 3.*
Repeated addition		Adding the same number repeatedly in order to find the answer to a multiplication problem. *e.g. 4 x 3 = 4 lots of 3 = 3 + 3 + 3*
Repeated subtraction		Subtracting the same number repeatedly in order to find the answer to a **division** problem. *e.g. 20 ÷ 5 = 5 can be subtracted from 20 four times so the answer is 4.*
Significant figures		With the number 368249, the 3 is the most significant digit, because it tells us that the number is 3 hundred thousand and something. It follows that the 6 is the next most significant, and so on. With the number 0.0000058763, the 5 is the most significant digit, because it tells us that the number is 5 millionths and something. The 8 is the next most significant, and so on.
Subitising		Recognising a quantity without counting, simply by looking. *e.g. seeing 3 dots on a card as 3 or 6 on a dice without counting them individually.*
Subtraction		To find the difference between two amounts, or the remainder, *e.g. The difference between 12 and 7 is 5 as 12 - 7=5.*

		Subtraction is the inverse of addition, e.g. e.g. 300 - ☐ = 230 could be solved by asking 230 + ☐ = 300
Sum		The result of adding together 2 or more numbers (only applies in addition). E.g. The sum of 5, 4 and 2 = 11.
Whole numbers		Any number from zero *e.g. 0, 1, 2, 3 (no negative numbers of fractions).*