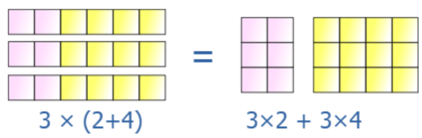
Mathematical Vocabulary Definitions

perceptual subitising	*Recognising how many things are in a group without having to count them one by one. Children need opportunities to see regular arrangements of small quantities, e.g. a dice face, structured manipulatives, etc., and be encouraged to say the quantity represented. Children also need opportunities to recognise small amounts (up to five) when they are not in the 'regular' arrangement, e.g. small handfuls of objects.*
conceptual subitising	*Seeing numbers within numbers e.g. 3 is made of 2 and 1. Consider the shape and colour of objects/pictures used- these can be distracting variables and choices depend on the purpose of task. e.g. colour can lead you into seeing a number differently.*
unitising	*A 'unit' does not need to have a value of one. This can mean considering one group of objects as a unit in its own right.*
numerosity	*How 'countable' something is.*
conservation	*Knowing that the number does not change if things are rearranged (so long as none have been added or taken away).*
cardinality	*The cardinal value of a number refers to the quantity of things it represents, e.g. the numerosity, 'howmanyness', or 'threeness' of three. When children understand the cardinality of numbers, they know what the numbers mean in terms of knowing how many things they refer to. Counting is one way of establishing how many things are in a group, because the last number you say tells you how many there are. Children enjoy learning the sequence of counting numbers long before they understand the cardinal values of the numbers. Subitising is another way of recognising how many there are, without counting.*
cardinal principle	*The number assigned to the final object in a group is the total number of objects in that group.*
stable order	*When counting the numbers have to be said in a certain order.*
1:1 principle	*Assigning one number name to each object that is being counted (tagged)- count each object only once and ensure every object is counted.*
abstraction	*Understanding that anything can be counted, even things that cannot be touched, moved or seen. Developing the abstraction principle allows children to count sounds, movement and even thoughts.*
ordinality	*A number denoting the position in a sequence e.g. first, second or page 1, page 2.*
order irrelevance	*The order we count a group of objects in is irrelevant – there will still be the same number.*
hierarchical inclusion	*A number contains all of the previous numbers e.g. if you have 4 cookies you also have 3,2,and 1 cookie.*
comparison	*Comparing numbers involves knowing which numbers are worth more or less than each other. This depends both on understanding cardinal values of numbers and also knowing that the later counting numbers are worth more (because the next number is always one more). This understanding underpins the mental number line which children will develop later, which represents the relative value of numbers.*
composition	*Knowing numbers are made up of two or more other smaller numbers involves 'part–whole' understanding. Learning to 'see' a whole number and its parts at the same time is a key development in children's number understanding. Partitioning numbers into other numbers and putting them back together again underpins understanding of addition and subtraction as inverse operations.*

inverse	*The opposite or reverse of an operation, position, direction, order or effect*
partitioning	*A way of splitting numbers into smaller parts to make them easier to work with.*
number bonds	*Pairs of numbers that can be added together to make another number e.g. 4 + 6 = 10.*
integer	*A whole number.*
proportionality	*When quantities have the same relative size. In other words they have the same ratio. Two quantities or variables are related in a linear manner. If one quantity doubles in size, so does the other; if one of the variables diminishes to 1/10 of its former value, so does the other.*
partition	*Separate a set into two or more subsets.*
algorithm	*When quantities have the same relative size. In other words they have the same ratio.*
Absolute value	*How far a number is from zero.*
abscissa	*The horizontal ("x") value in a pair of coordinates. How far along the point is.*
ordinate	*The vertical ("y") value in a pair of coordinates: how far up or down the point is.*
the origin	*The point (0,0) is given the special name "The Origin", and is sometimes given the letter "O".*
congruent	*The same shape and size (but we are allowed to flip, slide, or turn).*
Addition	
Additive identity	*The "Additive Identity" is 0, because adding 0 to a number does not change it:* *a + 0 = 0 + a = a*
aggregation (inverse of partitioning)	*The structure of addition in which two quantities are combined and addition is used to determine the sum, for example, 'There are two red flowers and eight yellow flowers. How many flowers are there altogether?'.*
augmentation (inverse of reduction)	*Where a quantity increases; it is 'augmented'.* *Addition as augmentation using situations where there is one element – the initial quantity of the element (the augend) is increased by an amount (the addend) and an addition is required to find the augmented value (the sum).*
augend	*The initial quantity of the element in addition.*
addend	*Increased amount in addition calculation.*
sum	*The augmented value (answer/total) of an addition calculation.*
aggregation vocabulary	
addend *addend* *sum*	*When the additive structure is aggregation .* *addend + addend = sum* *3 + 4 = 7* *In this example three and four are the addends and seven is the sum. Three is being combined/aggregated with four.*
augmentation vocabulary	
augend *addend* *sum*	*When the additive structure is augmentation.* *augend + addend = sum* *1 + 2 = 3* *In this example if one is the augend, two is the addend and three is the sum. One is being increased/ augmented by adding two.*

The commutative law of addition	Any operation * which has the property that $a * b = b * a$ for all members a and b of a given set is called **commutative**. For the set of real numbers: Addition is commutative, for example $2 + 3 = 3 + 2$. (Multiplication is also commutative, for example $2 \times 3 = 3 \times 2$) Subtraction and division are not commutative.
The associative law of addition	Any operation * which has the property that $a * (b * c) = (a * b) * c$ for all members a, b and c of a given set is called **associative**. For the set of real numbers: Addition is associative, e.g. $1 + (2 + 3) = (1 + 2) + 3$. (Multiplication is associative, e.g. $1 \times (2 \times 3) = (1 \times 2) \times 3$) Subtraction and division are not associative because, as counter examples, $1 - (2 - 3) \neq (1 - 2) - 3$ and $1 \div (2 \div 3) \neq (1 \div 2) \div 3$.
compensation properties	If one addend is increased and the other is decreased by the same amount, the sum stays the same. (same sum) If one addend is increased (or decreased) and the other is kept the same, the sum increases (or decreases) by the same amount. If the minuend and subtrahend are changed by the same amount, the difference stays the same. (same difference) If the minuend is increased (or decreased) and the subtrahend is kept the same, the difference increases (or decreases) by the same amount. If the minuend is kept the same and the subtrahend is increased (or decreased), the difference decreases (or increases) by the same amount.
additive inverse	What you add to a number to get zero. The negative of a number. Example: The additive inverse of -5 is $+5$, because $-5 + 5 = 0$ The additive inverse of $+5$ is -5, because $+5 - 5 = 0$
Subtraction	
The 'not' structure	The 'not' structure (subtraction)- e.g. There are 5 bears. 3 bears are in the cave. How many are not in the cave? PPW can be used to partition numbers to solve 'not' problems. When doing this start off by seeing all groups e.g. the 3 bears in the cave and the 2 not. When children are ready move onto some being hidden (e,g ,the bears not in the cave) This helps develop counting on as well as number bond knowledge NB: You can use PPW for this type of subtraction but not for reduction.
partitioning (inverse of aggregation)	is the structure of subtraction where you are finding a missing part when the whole and the other part are known, for example, 'There are 5 flowers. Two are red and the rest are yellow. How many yellow flowers are there?'
reduction (inverse of augmentation)	A quantity decreases; it is 'reduced' subtraction as reduction using situations where there is one element – the initial quantity of the element (the minuend) will decrease by an amount (the subtrahend) and a subtraction is required to find the reduced value (the difference).
subtrahend	The initial quantity of the element in subtraction
minuend	The amount decreased from a subtraction calculation
difference	The reduced value (answer) in a subtraction calculation

	The structure of **difference** for subtraction involves the comparison of two values – the difference is the 'gap' between the two values for example, 'Ben is 7 years older than Charlotte; Charlotte is 7 years younger than Ben; the difference between their ages is 7 years.'
minuend subtrahend difference	For all the structures of subtraction minuend – subtrahend = difference 5 – 4 = 1 In this example five is the minuend, four is the subtrahend and one is the difference
palindrome	Reads the same backwards and forwards e.g. the number "17371" is a palindrome.
reciprocal	The reciprocal of a number is: 1 divided by the number Examples: • the reciprocal of 2 is 1/2 (half) • the reciprocal of 10 is 1/10 (=0.1)
Multiplication	
repeated addition multiplication	Adding the same integer continuously. To save time when communicating our mathematics, we use the multiplication symbol. Hence 2 + 2 + 2 = 2 x 3. It is commonly visualised as an array.
scaling multiplication	Scaling increases an amount by a given scale factor. This is where one amount has increased in a multiplicative relation to another amount. For example, Jenny has 2 pens but Amy has 3 times as many pens. How many pens does Jenny have?
cartesian product	Where we find the number of possible combinations from two or more sets. Example: 'On a menu there are fries and sweet potato fries and both come in either a medium or large size. How many different ways are there to serve both types of fries?
multiplicand	The number of objects in each equal group.
multiplier	The number of equal groups. When we represent multiplication on a number line, the multiplier is the number of jumps that it takes to reach the product.
product	The answer when two or more values are multiplied together.
factor	Numbers we can multiply together to get another number. A number can have many factors.
common factor	When we find the factors of two or more numbers, and then find some factors are the same ("common"), then they are the "common factors".
the distributive law	Multiplying a number by a group of numbers added together is the same as doing each multiplication separately. Example: 3 × 6 = 3 x (2 + 4) = 3x2 + 3x4 So the "3" can be "distributed" across the "2+4" into 3 times 2 and 3 times 4. 
the associative law of multiplication	In a series of consecutive multiplications, the order in which their factors are multiplied makes no difference. So, to multiply 7x5x3, would be the same as solving (7x5) x3 as 7x (5x3), it will always give me 105. Knowing this property of multiplication, we can easily solve some operations that seem complicated by dividing the factors into products of smaller numbers; For example 7 × 15 can be difficult, but we can express 15 as 5 × 3 and get 7x5x3, which can be solved in several ways according to its

	associative property: *(7 * 5) * 3* *Or as it was at first 7x (5 × 3)*
the commutative law of multiplication	*The order of the factors does not change the product, that is, it does not matter if you multiply 7 × 5 or 5 × 7, the result will always be the same, 35. Thus, it may be that the multiplication table that was so hard for us to memorize is no longer so difficult because we can change the order of the factors and, 7 × 5, it is not as difficult, because the table of five is easier: 5 × 7 = 35*
Division	
quotative division	*Division equations can be used to represent 'grouping' problems total quantity (dividend) and the group size (divisor) are known; the number of groups (quotient) can be calculated by skip counting in the divisor.*
partitive division	*Division equations can be used to represent 'sharing' problems, where the total quantity (dividend) and the number we are sharing between (divisor) are known; the size of the shares (quotient) can be calculated by skip counting in the divisor.*
dividend	*Problems total quantity*
divisor	*The number we are 'grouping' or 'sharing' between*
quotient	*The size or the 'shares' or the number of 'groups'*
remainder	*The number left over after sharing or grouping. If the dividend is a multiple of the divisor, there is no remainder; if the dividend is not a multiple of the divisor, there is a remainder. The remainder is always less than the divisor.*