

Milestones for when children are expected to attain declarative knowledge

Nursery – Addition and subtraction				
Declarative knowledge	Procedural knowledge	Conditional knowledge	Vocabulary	Stem sentences
<p>I know that addition makes more.</p> <p>I know that subtraction makes less.</p> <p>I know that I can count 5 objects from a larger set.</p> <p>I know that when subitising the number does not change if the objects are re-arranged.</p> <p>I know that I can find fact families to 3 and then 5.</p> <p>I know that I can recall my number bonds to 3.</p> <p>I know that the last number reached when counting a small set of objects is the total, known as the 'cardinal principle'.</p> <p>I know that when counting objects, one less means removal of one object and one more means adding one object.</p>	<p>I know how to represent and use number bonds and related subtraction facts within 5.</p> <p>I know how to add and subtract 1 from numbers 1 - 3.</p> <p>I know how to use actions and sounds to help my counting.</p> <p>I know how to compare two images.</p> <p>I know how to use a number track to help my counting.</p>	<p>I know when solving calculation which operation to use.</p> <p>I know when I identifying totals how to use subitising to help me.</p>	<p>Total, cardinality, quantity, whole, object, set, order, subitise, fewer, less, smaller, larger, more, greater altogether, subitising</p> <p>Equal</p> <p>Adding</p> <p>Counting backwards</p> <p>Counting forwards</p> <p>One, two, three, four, five</p> <p>Number track</p>	<p>•1 more/ less than ___ is ___</p> <p>•I can see ___ and ___ so there is ___ in total.</p> <p>•There are ___ ducks in the pond and ___ ducks not in the pond. There are ___ ducks altogether.</p>

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Reception – Addition and subtraction				
Declarative knowledge	Procedural knowledge	Conditional knowledge	Vocabulary	Stem sentences
<p>I know that addition makes a bigger total.</p> <p>I know that subtraction makes a smaller total.</p> <p>I know that I can count on to totals to 10.</p> <p>I know that number bonds are pairs of numbers that can be added together to make a number.</p> <p>I know that I can find fact families to 5 and then 10.</p> <p>I know that I can recall my number bonds to 5</p> <p>I know that the last number reached when counting a small set of objects tells me how many there are in total ('cardinal principle').</p> <p>I know objects can be split into parts.</p>	<p>I know how to represent and use number bonds and related subtraction facts within 10.</p> <p>I know how to add and subtract 1-digit and 2- digit numbers to 10, including zero.</p> <p>I know how to find pairs to 5, 6 and then 7 in different contexts.</p> <p>I know how to find one more and one less than an amount.</p> <p>I know how to use number lines to help me with my counting.</p> <p>I know how to recognise numbers (subitise) rather than counting them.</p>	<p>I know when each operation is required and that adding makes a bigger total and subtracting makes a smaller total.</p> <p>I know when counting on to add from the first number and not to count from the beginning.</p> <p>I know when counting back 1 and 2 to subtract 1 and 2, rather than counting out what is left.</p> <p>I know when counting back to use numbers tracks and objects in different contexts.</p>	<p>Total, quantity, whole, objects, fewer, more than, order, subitise, larger, smaller, more, fewer, greater, less than, altogether, pair, number bonds, part-part whole model.</p>	<ul style="list-style-type: none"> •I counted _____. •I can see _____ •There are _____ altogether. •1 more/ less than ___ is ____ •The bond to ___ for ___ is ____ •I can see ___ without counting. •I can subitise _____

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Year 1 – Addition and subtraction				
Declarative knowledge	Procedural knowledge	Conditional knowledge	Vocabulary	Stem sentences
<p>I know that addition makes a larger total.</p> <p>I know that subtraction reduces the amount.</p> <p>I know that addition and subtraction are inverse operations.</p> <p>I know that counting back is 'take away' and counting on is 'find the difference'.</p> <p>I know that I can count on to totals to 20.</p> <p>I know that I can describe the effect of zero.</p> <p>I know that I can find fact families to 10 and then 20.</p> <p>I know that I can recall my number bonds to 10</p>	<p>I know how to read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs to solve calculations.</p> <p>I know how to represent and use number bonds and related subtraction facts within 20</p> <p>I know how to add and subtract 1-digit and 2- digit numbers to 20, including zero.</p> <p>I know how to identify the operation required and calculate using counting and known facts.</p> <p>I know how to add and subtract with money using the value of the coins.</p> <p>I know how to identify each operation required and can calculate using counting and known facts, including doubles and bridging the 10.</p>	<p>I know when each operation is required and can solve calculations using counting and known facts.</p> <p>I know when solving one-step problems that involve addition and subtraction, which strategy to use and why.</p> <p>I know when solving missing number problems, such as $7 = ? - 9$ which strategies to use and why.</p>	<p>+, add, more, plus make, sum, total altogether score double, near double one more, two more... ten more how many more to make...? how many more is... than...? how much more is...? -, subtract, take (away), minus leave how many are left/left over? how many have gone? one less, two less, ten less... how many fewer is... than...? how much less is...? difference between half, halve =, equals, sign, is the same as</p>	<p>• ____ is part and ____ is a part. The whole is ____</p> <p>• ____ plus ____ is equal to ____</p> <p>• ____ is equal to ____ plus ____</p> <p>• I need to start from ____ I need to make ____ jumps backwards to land on ____</p> <p>• 1 more/ less than ____ is ____</p> <p>• The bond to ____ for ____ is ____</p>

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Year 2 – Addition and subtraction				
Declarative knowledge	Procedural knowledge	Conditional knowledge	Vocabulary	Stem sentences
<p>I know that addition is inverse to subtraction.</p> <p>I know that addition is commutative.</p> <p>I know that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot.</p> <p>I know that I can recall my number bonds to 20.</p>	<p>I know how to use numbers knowledge to add and subtract</p> <p>I know how to recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100</p> <p>I know how to add and subtract numbers using concrete objects, pictorial representations, and mentally, including:</p> <ul style="list-style-type: none"> • A 2-digit number and ones • A 2-digit number and tens • Two 2-digit numbers • Adding three 1-digit numbers <p>I know how to recognise and use the inverse relationship between addition and subtraction and use this to check calculations and missing number problems</p>	<p>I know when finding the difference between two numbers I need to subtract the smaller number from the larger number.</p> <p>I know when solving problems which method to use and why.</p> <p>I know when checking calculations which method to use and why.</p> <p>I know when solving simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change which method to use and how to check my answer.</p> <p>I know when adding and subtracting up to two-digit number which strategies are more efficient and why.</p>	<p>+, add, addition, more, plus make, sum, total altogether score double, near double one more, two more... ten more... one hundred more how many more to make...? how many more is... than...? how much more is...? -, subtract, subtraction, take (away), minus leave, how many are left/left over? one less, two less... ten less... one hundred less how many fewer is... than...? how much less is...? difference between half, halve =, equals, sign, is the same as tens boundary</p>	<p>•I need to add ___ to ___ to make ____</p> <p>• ___ ones + ___ ones = ___ ones, so ___ tens + ___ tens = ___ tens. That means that ___ + ___ = _____</p> <p>•The difference between ___ and ___ is _____</p> <p>• ___ has ___ tens and ___ ones. ___ ones + ___ ones = ___ ones, so ___ + ___ = _____</p> <p>•To subtract ___ ones, I need to subtract 1 ___ times.</p> <p>• ___ and ___ are a number bond to _____</p> <p>•I need to subtract ___ to get to 10, I can partition ___ into ___ and ___ I need to subtract ___ more.</p> <p>•I need to exchange ___ for ___ I know I need to make an exchange because _____</p> <p>•The next 10 is ____. The bond to 10 for ___ is ____. I need to add ___ to ___ to get to the next 10.</p> <p>•The previous multiple of 10 is _____.</p>

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Year 3 – Addition and subtraction				
Declarative knowledge	Procedural knowledge	Conditional knowledge	Vocabulary	Stem sentences
<p>I know that I use my place value can add and subtract multiples of 10, 100 from three-digit numbers.</p> <p>I know that I can calculate with columnar methods regrouping the tens and exchanging in subtraction.</p> <p>I know that I understand when to use compact algorithms for addition and subtraction including regrouping and exchanging.</p>	<p>I know how to add and subtract numbers mentally.</p> <p>I know how to add and subtract numbers with up to 3 digits, using formal written methods of columnar addition and subtraction.</p> <p>I know how to use inverse operations to check my answers.</p> <p>I know how to solve calculations using columnar methods, ensuring I exchange and regroup successfully.</p> <p>I know how to estimate the answer to a calculation and use inverse operations to check answers.</p> <p>I know how to solve problems, including missing number problems, to use number facts, place value, and more complex addition and subtraction to help me find the answer.</p>	<p>I know when solving problems which method to use and why.</p> <p>I know when making estimates to use my place value knowledge to make accurate estimations.</p>	<p>+, add, addition, more, plus make, sum, total altogether score double, near double one more, two more... ten more... one hundred more how many more to make...? how many more is... than...? how much more is...? -, subtract, subtraction, take (away), minus leave, how many are left/left over? one less, two less... ten less... one hundred less how many fewer is... than...? how much less is...? difference between half, halve =, equals, sign, is the same as tens boundary, hundreds boundary</p>	<p>•I need to add ___ to ___ to make _____.</p> <p>• ___ ones plus ___ ones = ___ ones,so ___ tens + ___ tens = ___ tens. This means that ___ + ___ = _____.</p> <p>•The difference between ___ and ___ is _____.</p> <p>• ___ and ___ are a bond to _____</p> <p>• ___ can be partitioned into ___ and _____</p> <p>•If I know ___ then I know _____.</p> <p>•The inverse of ___ is _____</p>

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Year 4 – Addition and subtraction				
Declarative knowledge	Procedural knowledge	Conditional knowledge	Vocabulary	Stem sentences
<p>I know that I need to line up the digits correctly in the columns when using formal written methods.</p> <p>I know that I must start with the ones column when adding.</p> <p>I know that I can exchange 10 ones for 10, or 10 tens for 100 or 10 hundreds for one thousand.</p>	<p>I know how to add and subtract whole numbers with more than 4 digits using columnar methods.</p> <p>I know how to add and subtract numbers mentally with increasingly large numbers.</p> <p>I know how to use efficient methods for addition and subtraction up to and including four-digit numbers.</p> <p>I know how that I can add and subtract using standard written algorithms including in the context of money.</p> <p>I know how to use efficient written algorithms for addition and subtraction with increasing fluency for large numbers.</p> <p>I know how to find the difference between negative and positive numbers.</p> <p>I know how to check the accuracy of addition and subtraction calculations.</p>	<p>I know when I estimate, to use inverse operations to check answers to a calculation.</p> <p>I know when solving addition and subtraction two-step problems in contexts, which operations to use and why.</p>	<p>add, addition, more, plus, increase sum, total, altogether score double, near double how many more to make...? subtract, subtraction, take (away), minus, decrease leave, how many are left/left over? difference between half, halve how many more/fewer is... than...? how much more/less is...? equals, sign, is the same as tens boundary, hundreds boundary inverse</p>	<p>•I need to add ___ to ___ to make ____.</p> <p>•I can partition ___ into ___ and ___</p> <p>•I can partition flexibly ___ into ___ and ____</p> <p>•The inverse of ___ is ____</p> <p>•I cannot subtract ___ from ____ so I need to make an exchange</p> <p>•I can exchange 10 ___ for 1 ____</p> <p>•The next/ previous multiple of 10/100 or 1,000 is ____</p> <p>•The value of the ___ column will increase/ decrease by ____</p> <p>•___ is closer to ___ than ____</p> <p>•I need to exchange ___ for ___. I know I need to make an exchange because ____</p> <p>•The approximate answer is ____</p>

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Year 5 – Addition and subtraction				
Declarative knowledge	Procedural knowledge	Conditional knowledge	Vocabulary	Stem sentences
<p>I know that I can use compensation to help me with adding increasingly large numbers.</p> <p>I know that I need to use my knowledge of place value when lining up my digits.</p> <p>I know that I can use formal written methods of columnar addition and subtraction with increasingly large numbers and decimals.</p>	<p>I know how to add and subtract whole numbers with more than 4 digits using formal columnar addition</p> <p>I know how to add and subtract numbers mentally with increasingly large numbers.</p> <p>I know how to perform exchanges when adding and subtracting.</p> <p>I know how to work efficiently when performing calculations involving addition and subtraction.</p> <p>I know how to use the inverse to find missing numbers.</p> <p>I know how to use efficient methods of adding and subtracting.</p>	<p>I know when using efficient methods for adding and subtracting, how to check my answer using the inverse.</p> <p>I know when completing mental calculations with increasingly large numbers what strategies to choose and why.</p> <p>I know when estimating how to use rounding to help me make more accurate estimations.</p> <p>I know when solving addition and subtraction multi-step problems in context, which operation and method to choose and why.</p> <p>I know when to use efficient mental methods for addition and subtraction.</p>	<p>add, addition, more, plus, increase sum, total, altogether score double, near double how many more to make...? subtract, subtraction, take (away), minus, decrease leave, how many are left/left over? difference between half, halve how many more/fewer is... than...? how much more/less is...? equals, sign, is the same as tens boundary, hundreds boundary units boundary, tenths boundary inverse</p>	<p>•I need to add ___ to ___ to make ___</p> <p>•I can partition __ into __, __ and __ and then ___ the parts separately</p> <p>•The inverse of ___ is ___</p> <p>•If I add/ subtract __ to/ from one of the numbers the answer will change by ___</p> <p>•I cannot subtract ___ from ___ so I need to make an exchange.</p> <p>•In column addition/ I start from the column with the ___ value</p> <p>• ___ is closer to ___ than ___</p> <p>•I need to exchange ___ for ___ I know I need to make an exchange because _____</p> <p>•The first step to solving this problem is _____</p>

Milestones for when children are expected to attain declarative knowledge

Year 6 – Addition and subtraction				
Declarative knowledge	Procedural knowledge	Conditional knowledge	Vocabulary	Stem sentences
<p>I know that when performing operations with brackets, you must always complete what is in the brackets first.</p> <p>I know that I need to line up my digits correctly when setting out formal addition or subtraction.</p> <p>I know that an integer is a whole number.</p> <p>I know that I can use the rules of BIDMAS to help me with calculations.</p> <p>I know that I can use mental calculations with increasingly large numbers and more complex calculations.</p>	<p>I know how to perform mental calculations, including with mixed operations and large numbers.</p> <p>I know how to use my knowledge of the order of operations to carry out calculations involving the 4 operations.</p> <p>I know how to use inverse to help me check and solve calculations.</p>	<p>I know when to use the compact algorithms for all four operations.</p> <p>I know when to use estimation to check answers.</p> <p>I know when solving calculation with brackets, which order to complete them in and why.</p> <p>I know when solving addition and subtraction multi-step problems in contexts, how to decide which operations and methods to use and why.</p> <p>I know when using estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.</p>	<p>add, addition, more, plus, increase sum, total, altogether score double, near double how many more to make...? subtract, subtraction, take (away), minus, decrease leave, how many are left/left over? difference between half, halve how many more/fewer is... than...? how much more/less is...? equals, sign, is the same as tens boundary, hundreds boundary units boundary, tenths boundary inverse</p>	<p>•In column addition/ subtraction, we start with the ___ place value column.</p> <p>•The ___ is in the ___ column. It represents _____</p> <p>•If I add/subtract ___ to/ from one of my numbers in the calculation, then the answer will change by _____</p>