

Maths Knowledge, Skills and Progression Document

ADDITION AND SUBTRACTION



KEY	
Red Font	Ready-To-Progress Objectives
Green Font	Development Matters Objectives
Blue Font	Recap Lessons

Knowledge, Skills and Vocabulary			
Year Group	Objectives	Small Steps	Vocabulary
FS1	<ul style="list-style-type: none"> ➤ Develop fast recognition of up to 3 objects, without having to count them individually ('subitising'). ➤ Recite numbers past 5. ➤ Say one number for each item in order: 1,2,3,4,5. ➤ Know that the last number reached when counting a small set of objects tells you how many there are in total ('cardinal principle'). ➤ Show 'finger numbers' up to 5. ➤ Link numerals and amounts: for example, showing the right number of objects to match the numeral, up to 5. ➤ Experiment with their own symbols and marks as well as numerals. ➤ Solve real world mathematical problems with numbers up to 5. ➤ Compare quantities using language: 'more than', 'fewer than'. ➤ <i>Be able to count 5 objects out from a larger pile.</i> 	<ul style="list-style-type: none"> ➤ Point to small groups of two or three objects: "Look, there are two!" Occasionally ask children how many there are in a small set of two or three. Regularly say the counting sequence, in a variety of playful contexts, inside and outdoors, forwards and backwards, sometimes going to high numbers. For example: hide and seek, rocket-launch countdowns. Count things and then repeat the last number. For example: "1, 2, 3 – 3 cars". Point out the number of things whenever possible; so, rather than just 'chairs', 'apples' or 'children', say 'two chairs', 'three apples', 'four children'. Ask children to get you several things and emphasise the total number in your conversation with the child. Use small numbers to manage the learning environment. Suggestions: have a pot labelled '5 pencils' or a crate for '3 trucks'. Draw children's attention to these throughout the session and especially at tidy-up time: "How many pencils should be in this pot?" or "How many have we got?" etc ➤ Encourage children in their own ways of recording (for example) how many balls they managed to throw through the hoop. Provide numerals nearby for reference. Suggestions: wooden numerals in a basket or a number track on the fence. Discuss mathematical ideas throughout the day, inside and outdoors. Suggestions: • "I think Jasmin has got more crackers..." • support children to solve problems using fingers, objects and marks: "There are four of you, but there aren't enough chairs..." • draw children's attention to differences and changes in amounts, such as those in stories like 'The Enormous Turnip'. 	<p>add, more, and make, sum, total altogether double one more, two more ... ten more how many more to make ...? how many more is ... than ...? how much more is ...? take away 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</p>
FS2	<p>Number</p> <ul style="list-style-type: none"> ➤ Have a deep understanding of number to 10, including the composition of each number; ➤ Subitise (recognise quantities without counting) up to 5; ➤ Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts. <p>Numerical Patterns</p> <ul style="list-style-type: none"> ➤ Verbally count beyond 20, recognising the pattern of the counting system; ➤ Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity; ➤ - Explore and represent patterns within numbers up to 10, including evens and odds, 	<ul style="list-style-type: none"> ➤ Develop the key skills of counting objects including saying the numbers in order and matching one number name to each item. Say how many there are after counting – for example, "...6, 7, 8. There are 8 balls" – to help children appreciate that the last number of the count indicates the total number of the group. This is the cardinal counting principle. Say how many there might be before you count to give a purpose to counting: "I think there are about 8. Shall we count to see?" Count out a smaller number from a larger group: "Give me seven..." Knowing when to stop shows that children understand the cardinal principle. Build counting into everyday routines such as register time, tidying up, lining up or counting out pieces of fruit at snack time. Sing counting songs and number rhymes and read stories that involve counting. Play games which involve counting. Identify children who have had less prior experience of counting and provide additional opportunities for counting practice ➤ Show small quantities in familiar patterns (for example, dice) and random arrangements. Play games which involve quickly revealing and hiding numbers of objects. Put objects into five frames and then ten frames to begin to familiarise children with the tens structure of the number system. Prompt children to subitise first when enumerating groups of up to 4 or 5 objects: "I don't think we need to count those. They are in a square shape so there must be 4." 	

	<p>double facts and how quantities can be distributed equally</p>	<p>Count to check. Encourage children to show a number of fingers 'all at once', without counting.</p> <ul style="list-style-type: none"> ➤ Display numerals in order alongside dot quantities or tens frame arrangements. Play card games such as snap or matching pairs with cards where some have numerals, and some have dot arrangements. Discuss the different ways children might record quantities (for example, scores in games), such as tallies, dots and using numeral cards. ➤ Count verbally beyond 20, pausing at each multiple of 10 to draw out the structure, for instance when playing hide and seek, or to time children getting ready. Provide images such as number tracks, calendars and hundred squares indoors and out, including painted on the ground, so children become familiar with two-digit numbers and can start to spot patterns within them. ➤ Provide collections to compare, starting with a very different number of things. Include more small things and fewer large things, spread them out and bunch them up, to draw attention to the number not the size of things or the space they take up. Include groups where the number of items is the same. Use vocabulary: 'more than', 'less than', 'fewer', 'the same as', 'equal to'. Encourage children to use these words as well. Distribute items evenly, for example: "Put 3 in each bag," or give the same number of pieces of fruit to each child. Make deliberate mistakes to provoke discussion. Tell a story about a character distributing snacks unfairly and invite children to make sure everyone has the same. ➤ Make predictions about what the outcome will be in stories, rhymes and songs if one is added, or if one is taken away. Provide 'staircase' patterns which show that the next counting number includes the previous number plus one. ➤ Focus on composition of 2, 3, 4 and 5 before moving onto larger numbers Provide a range of visual models of numbers: for example, six as double three on dice, or the fingers on one hand and one more, or as four and two with ten frame images. Model conceptual subitising: "Well, there are three here and three here, so there must be six." Emphasise the parts within the whole: "There were 8 eggs in the incubator. Two have hatched and 6 have not yet hatched." Plan games which involve partitioning and recombining sets. For example, throw 5 beanbags, aiming for a hoop. How many go in and how many don't? ➤ Have a sustained focus on each number to and within 5. Make visual and practical displays in the classroom showing the different ways of making numbers to 5 so that children can refer to these. Help children to learn number bonds through lots of hands-on experiences of partitioning and combining numbers in different contexts, and seeing subitising patterns. Play hiding games with a number of objects in a box, under a cloth, in a tent, in a cave, etc.: "6 went in the tent and 3 came out. I wonder how many are still in there?" Intentionally give children the wrong number of things. For example: ask each child to plant 4 seeds then give them 1, 2 or 3. "I've only got 1 seed, I need 3 more." Spot and use opportunities for children to apply number bonds: "There are 5 of us but only 2 clipboards. How many more do we need?" Place objects into a five frame and talk about how many spaces are filled and unfilled. 	
Year 1	<ul style="list-style-type: none"> ➤ Represent and use number bonds and related subtraction facts within 10 ➤ Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs. ➤ Add and subtract one digit numbers to 10, including zero. ➤ Solve one step problems that involve addition and subtraction, using concrete objects and pictorial representations and missing number problems. 	<ul style="list-style-type: none"> ➤ Introducing parts and wholes ➤ Part whole model with images and objects ➤ Part whole model ➤ Addition symbol ➤ Fact families – Addition facts ➤ Find number bonds for numbers within 10 ➤ Systematic methods for number bonds within 10 ➤ Number bonds to 10 ➤ Compare number bonds ➤ Addition: Adding together ➤ Addition: Adding more ➤ Addition using bonds ➤ Finding a part ➤ Subtraction: Taking away, how many left? Crossing out ➤ Subtraction: Taking away, how many left? Introducing the subtraction symbol ➤ Subtraction: Finding a part, breaking apart ➤ Fact families – The 8 facts ➤ Subtraction: Counting back ➤ Subtraction: Finding the difference 	<p>addition</p> <p>add, more, and</p> <p>make, sum, total</p> <p>altogether</p> <p>double</p> <p>near double</p> <p>half, halve</p> <p>one more, two more ... ten more</p> <p>how many more to make ...?</p> <p>how many more is ... than ...?</p> <p>how much more is ...?</p> <p>subtract</p> <p>take away</p> <p>how many are left/left over?</p>

	<ul style="list-style-type: none"> ➤ Represent and use number bonds and related subtraction facts within 20 ➤ Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs. ➤ Add and subtract one-digit and twodigit numbers to 20, including zero. ➤ Solve one step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = \square - 9$ 	<ul style="list-style-type: none"> ➤ Comparing addition and subtraction statements $a + b > c$ ➤ Comparing addition and subtraction statements $a + b > c + d$ ➤ Add by counting on ➤ Add ones using number bonds ➤ Add ones using number bonds (2) ➤ Find &make number bonds ➤ Add by making 10 ➤ Subtraction –Not crossing 10 ➤ Subtraction –Crossing 10 (1) ➤ Subtraction –Crossing 10 (2) ➤ Related Facts ➤ Compare Number Sentence 	<p>how many have gone? one less, two less, ten less ... how many fewer is ... than ...? how much less is ...? difference between equals is the same as number bonds/pairs missing number</p>
Year 2	<ul style="list-style-type: none"> ➤ Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100. ➤ Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: a two-digit number and ones; a two-digit number and tens; two two-digit numbers; adding three one-digit numbers. ➤ Show that the addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot. ➤ Solve problems with addition and subtraction: using concrete objects and pictorial representations, including those involving numbers, quantities and measures; applying their increasing knowledge of mental and written methods. ➤ Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems. 	<ul style="list-style-type: none"> ➤ Fact families – Addition and subtraction bonds to 20 ➤ Check calculations ➤ Compare number sentences ➤ Know Your Bonds ➤ Related facts ➤ Bonds to 100 (tens) ➤ Add and subtract 1s ➤ 10 more and 10 less ➤ Add and subtract 10s ➤ Add By Making 10 ➤ Add a 2-digit and 1-digit number – crossing ten ➤ Subtraction – Crossing 10 ➤ Subtract a 1-digit number from a 2-digit number – crossing ten ➤ Add two 2-digit numbers – not crossing ten – add ones and add tens ➤ Add two 2-digit numbers – crossing ten – add ones and add tens ➤ Subtract a 2-digit number from a 2-digit number – not crossing ten ➤ Subtract a 2-digit number from a 2-digit number – crossing ten – subtract ones and tens ➤ Find and Make Number Bonds ➤ Bonds to 100 (tens and ones) ➤ Add three 1-digit number 	<p>addition add, more, and make, sum, total altogether double near double half, halve one more, two more ... ten more ... one hundred more how many more to make ...? how many more is ... than ...? how much more is ...? subtract take away how many are left/left over? how many have gone? one less, two less, ten less ... one hundred less how many fewer is ... than ...? how much less is ...? difference between equals is the same as number bonds/pairs/facts tens boundary</p>
Year 3	<ul style="list-style-type: none"> ➤ Add and subtract numbers mentally, including: a three-digit number and ones; a three-digit number and tens; a three digit number and hundreds. ➤ Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction. ➤ Estimate the answer to a calculation and use inverse operations to check answers. 	<ul style="list-style-type: none"> ➤ Add and subtract multiples of 100 ➤ Add and Subtract 1s ➤ Add and subtract 3-digit numbers and ones – not crossing 10 ➤ Add a 2-digit and 1-digit number - crossing 10 ➤ Add 3-digit and 1-digit numbers – crossing 10 ➤ Subtract a 1-digit number from 2-digits - crossing 10 ➤ Subtract a 1-digit number from a 3-digit number – crossing 10 ➤ Add and subtract 3-digit numbers and tens – not crossing 100 ➤ Add a 3-digit number and tens – crossing 100 ➤ Subtract tens from a 3-digit number – crossing 100 	<p>addition add, more, and make, sum, total altogether double near double half, halve</p>

	<ul style="list-style-type: none"> ➤ Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction. 	<ul style="list-style-type: none"> ➤ Add and subtract 100s ➤ Spot the pattern – making it explicit ➤ Add two 2-digit numbers - crossing 10 - add ones & add tens ➤ Subtract a 2-digit number from a 2-digit number - crossing 10 - subtract ones & subtract tens ➤ Mixed addition and subtraction problems ➤ Add and subtract a 2-digit and 3-digit number – not crossing 10 or 100 ➤ Add a 2-digit and 3-digit number – crossing 10 or 100 ➤ Subtract a 2-digit number from a 3-digit number – cross the 10 or 100 ➤ Add two 3-digit numbers – not crossing 10 or 100 ➤ Add two 3-digit numbers – crossing 10 or 100 ➤ Subtract a 3-digit number from a 3-digit number – no exchange ➤ Subtract a 3-digit number from a 3-digit number – exchange ➤ Estimate answers to calculations ➤ Check 	<p>one more, two more ... ten more ... one hundred more</p> <p>how many more to make ...?</p> <p>how many more is ... than ...?</p> <p>how much more is ...?</p> <p>subtract</p> <p>take away</p> <p>how many are left/left over?</p> <p>how many have gone?</p> <p>one less, two less, ten less ... one hundred less</p> <p>how many fewer is ... than ...?</p> <p>how much less is ...?</p> <p>difference between</p> <p>equals</p> <p>is the same as</p> <p>number bonds/pairs/facts</p> <p>missing number</p> <p>tens boundary, hundreds boundary</p>
Year 4	<ul style="list-style-type: none"> ➤ Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate. ➤ Estimate and use inverse operations to check answers to a calculation. ➤ Solve addition and subtraction two step problems in contexts, deciding which operations and methods to use and why. 	<ul style="list-style-type: none"> ➤ Add and subtract 1s, 10s, 100s and 1000s ➤ Add two 3-digit numbers - not crossing 10 or 100 ➤ Add two 4-digit numbers – no exchange ➤ Add two 3-digit numbers - crossing 10 or 100 ➤ Add two 4-digit numbers – one exchange ➤ Add two 4-digit numbers – more than one exchange ➤ Subtract a 3-digit number from a 3-digit number - no exchange ➤ Subtract two 4-digit numbers – no exchange ➤ Subtract a 3-digit number from a 3-digit number - exchange ➤ Subtract two 4-digit numbers – one exchange ➤ Subtract two 4-digit numbers – more than one exchange ➤ Efficient subtraction ➤ Estimate answers ➤ Checking strategies 	<p>addition</p> <p>add, more, and</p> <p>make, sum, total</p> <p>altogether</p> <p>double</p> <p>near double</p> <p>half, halve</p> <p>one more, two more... ten more... one hundred more</p> <p>how many more to make ...?</p> <p>how many more is ... than ...?</p> <p>how much more is ...?</p> <p>subtract</p> <p>take away</p> <p>how many are left/left over?</p> <p>how many have gone?</p> <p>one less, two less, ten less ... one hundred less</p> <p>how many fewer is ... than ...?</p> <p>how much less is ...?</p> <p>difference between</p> <p>equals</p> <p>is the same as</p> <p>number bonds/pairs/facts</p> <p>missing number</p> <p>tens boundary, hundreds boundary</p> <p>inverse</p>

Year 5	<ul style="list-style-type: none"> ➤ Add and subtract numbers mentally with increasingly large numbers. ➤ Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy. ➤ Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why. 	<ul style="list-style-type: none"> ➤ Add two 4-digit numbers - one exchange ➤ Add two 4-digit numbers - more than one exchange ➤ Add whole numbers with more than 4-digits (column method) ➤ Subtract two 4-digit numbers - one exchange ➤ Subtract two 4-digit numbers - more than one exchange ➤ Subtract whole numbers with more than 4-digits (column method) ➤ Round to estimate and approximate ➤ Inverse operations (addition and subtraction) ➤ Multi-step addition and subtraction problems 	<p>addition add, more, and make, sum, total altogether double near double half, halve one more, two more ... ten more ... one hundred more how many more to make ...? how many more is ... than ...? how much more is ...? subtract take away how many are left/left over? how many have gone? one less, two less, ten less ... one hundred less how many fewer is ... than ...? how much less is ...? difference between equals is the same as number bonds/pairs/facts missing number tens boundary, hundreds boundary, ones boundary, tenths boundary inverse</p>
Year 6	<ul style="list-style-type: none"> ➤ Solve addition and subtraction multi step problems in contexts, deciding which operations and methods to use and why. ➤ Perform mental calculations, including with mixed operations and large numbers. ➤ Use their knowledge of the order of operations to carry out calculations involving the four operations. ➤ Solve problems involving addition, subtraction, multiplication and division. ➤ Use estimation to check answers to calculations and determine in the context of a problem, an appropriate degree of accuracy. 	<ul style="list-style-type: none"> ➤ Add whole numbers with more than 4 digits (column method) ➤ Subtract whole numbers with more than 4 digits (column method) ➤ Inverse operations (addition and subtraction) ➤ Multi-step addition and subtraction problems ➤ Add and subtract whole numbers ➤ Order of operations ➤ Mental calculations and estimation ➤ Reasoning from known facts 	<p>addition add, more, and make, sum, total altogether double near double half, halve one more, two more ... ten more ... one hundred more how many more to make ...? how many more is ... than ...? how much more is ...? subtract take away how many are left/left over? how many have gone? one less, two less, ten less ... one hundred less how many fewer is ... than ...?</p>

			<p>how much less is ...? difference between equals is the same as number bonds/pairs/facts missing number tens boundary, hundreds boundary, ones boundary, tenths boundary inverse</p>
Year 7	<p>Pupils should be taught to:</p> <ul style="list-style-type: none"> ➤ use the four operations, including formal written methods, applied to integers, decimals, proper and improper fractions, and mixed numbers, all both positive and negative ➤ use integer powers and associated real roots (square, cube and higher), recognise powers of 2, 3, 4, 5 and distinguish between exact representations of roots and their decimal approximations ➤ interpret and compare numbers in standard form $A \times 10^n$ $1 \leq A$ 	<ul style="list-style-type: none"> ➤ Information from a range of secondary schools to be gathered directly 	