

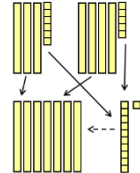
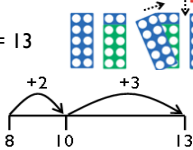
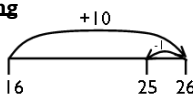
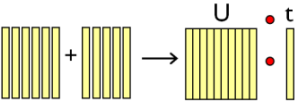
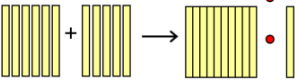
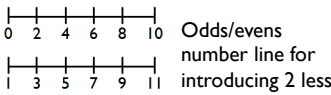
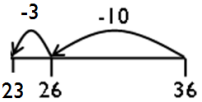
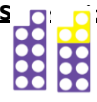
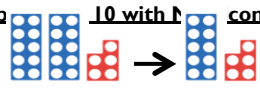

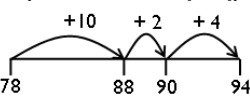
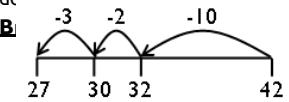
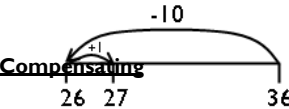




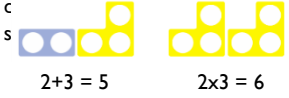
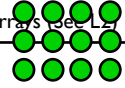

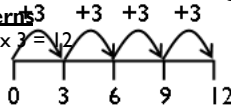

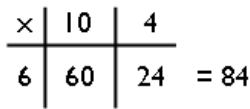
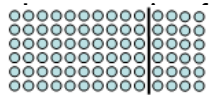
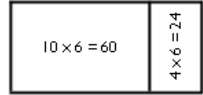
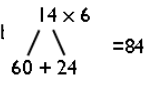
WFA Edited – Progression in Teaching and Learning Addition

Level and Notes	Written Calculations	Models & Images	Mental Calculations	Known Facts
<p>Foundation Stage End of Year Early Learning Goals (ELG)</p>	<p>- In practical activities & discussion, begin to use the vocab of addition Records, using marks that they can interpret and explain</p>	<p>-In practical activities & discussion, using quantities and objects, (including models and manipulatives) add two single digit numbers</p>	<p>-Say which number is one more than a given number to 20 (Verbally)</p>	<p>-Know some doubles to 10 and use these to solve practical problems.</p>
<p>Level 1</p> <p>- Essential to develop cardinal and ordinal representations of number in parallel but DON'T let children rely on ordinal counting for calculating</p> <p>- Understand + as finding the total of two or more sets of objects</p> <p>- Introduce 'How many more?'</p>	<p>Record their work, e.g.</p> <p>- record their work with objects, pictures or diagrams</p> <p>-begin to use the symbols '+' and '=' to record LI additions</p> <p>-e.g. $10 + 5 = 15$; $3 + ? = 7$; $10 = 8 + 2$</p> <p>- Uses numbers up to 20</p>	<p>Numicon</p> <p>10 = odd + odd or even + even</p>  <p>Doubles of whole numbers are always even</p> 	<p>Move beyond counting on as an addition strategy.</p> <p>Partitioning</p> <p>- Children partition single digit numbers (e.g. $5 = 2 + 3$, read as "5 is made up of 2 and 3")</p>	<p>Instant recall</p> <ul style="list-style-type: none"> •Doubles of numbers to 5 •Number bonds to 10 •Addition facts for totals to 5 <p>Derived</p> <ul style="list-style-type: none"> •U + 1 (link to 'one more') •U + 2 (link to odds/evens counting) •10 + U (Using combining rather than counting in 1s)
<p>Level 2</p> <p>- Check that children are not getting stuck in a counting in 1s strategy. A good sense check is that they don't add 10 (e.g. $25 + 10$) by counting on on their fingers but instead think '2 tens and 5 units plus 1 ten = 3 tens and 5 units'</p>	<p>Partitioning</p> <p>Add two digit numbers using a written method, e.g.</p> <p>– use written methods that involve bridging 10</p> $\begin{array}{r} 36 \\ + 45 \\ \hline 70 + 11 = 81 \end{array}$	<p>Partitioning (Numicon/Dienes)</p>  <p>$36 + 45 = 81$</p> <p>Bridging - Teach with 8 sandwich then represent on number line</p>	<p>Begin to add multiples of 10 to a 2 digit number, e.g. calculate $26 + 30$</p> <p>(By counting on in 10s or partitioning)</p> <p>Record their work in writing, e.g.</p> <p>- record their mental calculations as number sentences</p>	<p>Instant recall</p> <ul style="list-style-type: none"> •Doubles of numbers to 10 and corresponding halves •Number bonds to 20 •Multiples of 10 which total 100 <p>Derived</p> <ul style="list-style-type: none"> •All addition facts for totals to 10 •Add 10 to any number to 90 <p>(Model with Numicon)</p>
<p>Level 3</p> <p>- Don't forget to show you can add more than 2 numbers in column addition</p> <p>- Look at adding strings of single digit numbers, e.g. $6 + 3 + 4 + 9 =$ by finding number bonds to 10 first</p> $\begin{array}{r} 6 + 3 + 4 + 9 \\ \hline 10 + 12 = 22 \end{array}$	<p>Column addition</p> <p>Add three digit numbers involving bridging 10 or 100</p> $\begin{array}{r} 239 \\ 154 \\ \hline 393 \end{array}$ <p>-Add decimals in the context of money where bridging is not required</p>	<p>$8 + 5 = 13$</p>  <p>Compensating</p> <p>$16 + 9 = 25$</p> 	<p>Add 2 digit numbers mentally, e.g.</p> <p>-Calculate $36 + 19$</p> <p>(Partitioning, compensating, bridging or near doubles)</p> <p>-Complements to 100</p>	<p>Instant recall</p> <ul style="list-style-type: none"> •Double 15, 25, 35, 45 and corresponding halves <p>Derived</p> <ul style="list-style-type: none"> •All addition facts for totals to 20 •(Derived using compensating, bridging or near doubles) •Addition facts for multiples of 10, e.g. $70 + 90 = 160$ •Multiples of 5 which total 100
<p>Level 4</p> <p>-When working with money, teach that e.g. $£2.99 + £5.99$ can quickly be added mentally using compensating ($£3 + £6 - 2p$)</p> <p>-Chn should 'see' decimals so that they are not saying $0.5 + 0.6 = 0.11$</p>	<p>Column addition</p> <p>Use efficient written methods of addition, e.g.</p> <p>- calculate $1202 + 45 + 367$</p> <p>- add decimals to 2 places</p>	<p>Column addition</p> <p>Model using dienes to show the carrying into the next column</p> <p>Addition facts for decimals</p> <p>Introduce using dienes: $0.6 + 0.5 = 1.1$</p> 	<p>Calculation complements to 1000 for multiples of 10, e.g.</p> <p>$340 + \underline{\quad} = 1000$</p>	<p>Derived</p> <ul style="list-style-type: none"> •Doubles of tenths to 0.9 and corresponding halves •Addition facts for tenths up to 0.9, e.g. $0.7 + 0.9 = 1.6$
<p>Level 5</p>	<p>Column addition</p> <p>Add numbers that do not have the same number of decimal places</p>		<p>Calculate decimal complements to 10 or 100</p>	<p>Derived</p> <ul style="list-style-type: none"> •Doubles of hundredths to 0.09 and corresponding halves •Addition facts for hundredths

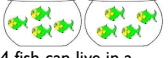


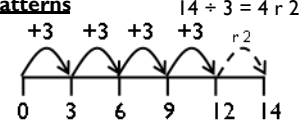

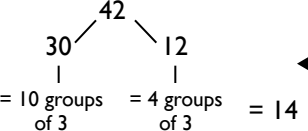
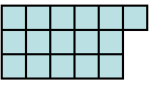

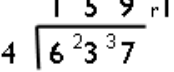
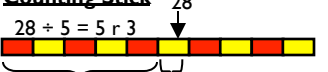
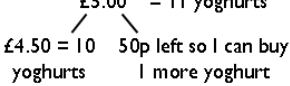
WFA Edited – Progression in Teaching and Learning Subtraction

Level and Notes	Written Calculations	Models & Images	Mental Calculations	Known Facts
Foundation Stage End of Year Early Learning Goals (ELG)	- In practical activities & discussion, begin to use the vocab of subtraction Records, using marks that they can interpret and explain.	In practical activities & discussion, using quantities and objects, (including models and manipulatives) subtract two single digit numbers.	Say which number is one less than a given number to 20 (Verbally)	- Solve problems, in practical contexts, involving halving.
Level 1 - Understand subtraction as ‘taking away’ objects from a set and finding how many are left but need to quickly move beyond counting to known fact strategies	Record their work, e.g. - record their work with objects, pictures or diagrams - begin to use the symbols ‘-’ and ‘=’ to record calcs with numbers to 20	Number line for 1 less only!  Odds/evens number line for introducing 2 less	- Children start to express subtraction facts for addition facts which they have instant recall of e.g. doubles of numbers to 5, number bonds to 10	<u>Instant recall</u> • Halves of even numbers to 10 • ‘One less’ than numbers to 20 <u>Derived</u> Subtract 2 from nos to 10, using odds/evens counting pattern
Level 2 - ‘How many more’ should be introduced in + and not related to subtraction until L3 (despite what L2 LOs and APP say) e.g. $8 + \underline{\quad} = 11$ - Count in 10s and 1s first then, quickly move to more efficient jumps (see bridging pic)	<u>Counting back on number line</u> Subtract two digit numbers using a written method (including bridging) 	Use partitioning to subtract two digit numbers S:  Sub: 	- Children partition single digit numbers (e.g. $9 = 3 + 6$, read as “9 is made up of 3 and 6”) leading to subtraction facts from nos to 10  - Use part part whole model to link to addition facts esp for those which bridge 10, e.g. $13 - 9 = 4$	<u>Instant recall</u> • Halves of even numbers to 20 • Subtraction facts from 10 <u>Derived</u> • Subtraction facts from numbers to 10 (e.g. $9 - 2 = 7$) • Subtract 10 from any number to 100 (Model with Numicon)
Level 3 -Need to really work on building understanding of subtraction as ‘finding the difference/counting on’. Reinforce constantly. - ‘Never partition for take away’ Need to teach this explicitly as otherwise chn will partition - Give chn lots of practice on choosing when to use counting on (small difference/numbers close together) vs counting back (large diff/ taking away a small amount)	Subtract three-digit numbers including bridging 10 or 100 <u>Counting back on a number line</u> (see L2) OR Co for 94: 	Until chn can do this seamlessly, do: B:  Compensating: 	Subtract 2 digit numbers mentally, e.g. -Calculate $63 - 26$ (Counting back or counting on incl using compensating or bridging where relevant) -Complements to 100, e.g. $100 - 64$ (Counting on strategy)	<u>Instant recall</u> • Half of 90, 70, 50 and 30 <u>Derived</u> • All subtraction facts from numbers to 20 (derived using bridging, compensating or near doubles) • Subtraction facts for multiples of 10, e.g. $160 - 70 = 90$
Level 4 -When working with money, teach that when finding change from a round number (e.g. £5, £10, £20) it is easier to count on on a number line than use column subtraction. -Keep chn visualising the starting number to help them to remember to exchange when necessary	<u>Column subtraction</u> Use efficient written methods of subtraction, e.g. $\begin{array}{r} 3512 \\ - 124 \\ \hline 238 \end{array}$ - Calculate $1025 - 336$ - Subtract decimals to 2 places	<u>Column subtraction</u> Model exchanging using dimes, as shown 	Continue to use counting on/ counting back for all calculations that can and should be done mentally	<u>Instant recall</u> • Half of 9, 7, 5 and 3 <u>Derived</u> • Halves of decimals to 1 dp for even tenths, e.g. half of 5.8
Level 5 - Reinforcing alignment of dps for column subtraction. Show how chn	<u>Column subtraction</u> Subtract numbers that do not have the same number of decimal places		Continue to use counting on/ counting back for all calculations that can and should be done mentally	<u>Derived</u> • Halves of decimals to 1 dp for odd tenths, e.g. half of 5.7

WFA- Edited – Progression in Teaching and Learning Multiplication

Level and Notes	Written Calculations	Models & Images	Mental Calculations	Known Facts
<p>Foundation Stage End of Year Early Learning Goals (ELG)</p>	<p>Records using marks that they can interpret and explain.</p> <p>Informal jottings, mathematical mark making,, problem solving process, use of blank paper.</p>	<p>Repeated groups of the same size</p>	<p>Count repeated groups of the same size</p> <p>Respond to/make up mathematical stories</p>	<p>Begin to count in 2s, 5s and 10s</p>
<p>Level 1</p> <p>Practise counting including using visual support</p> 		<p>Numicon Practise showing the</p>  <p>$2+3=5$ $2 \times 3=6$</p> <p>- Start to use arrays, see L2</p>  <p>$4 \times 3=12$</p> <p>Arrays</p>	<p>Use 2s, 5s and 10s skip counting to answer questions such as "What is 6 groups of 5" supported by</p> 	<p>Instant recall</p> <ul style="list-style-type: none"> Doubles of numbers to 5
<p>Level 2</p> <p>Practise counting in 3s</p> <p>Use repeated addition to solve multiplication problems</p>	<p>Repeated addition on a number line for less familiar counting patterns</p> <p>e.g. $4 \times 3=12$</p> 	<p>Counting stick times tables</p>  <p>area</p>	<p>- Use counting up in 3s, 5s and 10s (using fingers to keep track of groups) to start to derive multiplication facts, phrased as 'what is 4 times 3' or ;how many in four groups of 3'</p>	<p>Instant recall</p> <ul style="list-style-type: none"> Doubles of numbers to 10 Begin to know times table facts for 3, 5 and 10tt
<p>Level 3</p> <p>-Chn need to get VERY confident with all tts: 2, 3, 4, 5, 10 should be instant recall; Can use double of 3 and 4 tt for 6 and 8 tt; Can use finger method initially for 9tt; 7tt can then be derived from others</p> <p>-However, all should then be reinforced through consistent use of Jill Mansergh technique</p>	<p>Grid method $14 \times 6 = 84$</p> <p>Multiply a 2 digit number by 2, 3, 4, 5 & 6</p> 	<p>'Rows of chairs in hall' (array) as visual meth</p>  <p>grid</p> 	<p>-Multiply a number by doubling and doubling again</p> <p>-Multiply a 2 digit whole number by 10</p>	<p>Instant recall</p> <ul style="list-style-type: none"> Double 15, 25, 35, 45 Mental recall of 2, 3, 4, 5 and 10 Begin to know times table facts for 6, 7, 8 and 9tt <p>Derived</p> <ul style="list-style-type: none"> Times table facts for 6, 7, 8 and 9tt (see notes) Times tables & place value calculations such as 70×3
<p>Level 4</p> <p>- Recognise and describe number relationships, incl multiple, factors and squares</p>	<p>Short multiplication for digit multiplication</p> <p>- Use efficient methods of short multiplication</p> <p>- Multiply a simple decimal by a single digit, e.g. 36.2×8</p> <p>Grid method</p> <p>Extend grid method to use with a single digit x decimal as well</p>	<p>Use Dienes to introduce short multiplication</p> <p>See separate sheet for fully worked through example</p> <p>Grid method</p> <p>Extend grid method to use with a single digit x decimal</p>	<p>-Use place value to multiply a whole number by 10 or 100</p> <p>-Multiply two multiples of 10 together, e.g. 40×30</p> <p>Partitioning</p> <p>Multiply teens num digit by visualised partitioning</p> 	<p>Instant recall</p> <ul style="list-style-type: none"> Recall multiplication facts up to 10×10 Quickly derive corresponding division facts <p>Derived</p> <ul style="list-style-type: none"> Times tables & PV calculations with decimals such as 0.7×3
<p>Level 5</p>	<p>Short multiplication or grid</p> <p>Multiply decimal numbers by a single digit, e.g. 31.62×8</p> <p>Multiply any 3 digit number by any 2 digit number</p>		<p>-Multiply decimals and whole number by 10, 100 and 1000</p> <p>-Multiply a two digit number by a single digit</p>	<p>Instant recall</p> <ul style="list-style-type: none"> Times tables & place value calculations such as 40×3 <p>Derived</p> <ul style="list-style-type: none"> Times tables & PV calculations

WFA Edited – Progression in Teaching and Learning Division

Level and Notes	Written Calculations	Models & Images	Mental Calculations	Known Facts
<p>A note about grouping and sharing in division: When asked to show a picture or tell a story for a division sentence, e.g. $8 \div 4$, most people give a sharing example (sweets model rather than fish model in image). However, mathematically, grouping is a much more useful way into division in that it allows children to use their skip counting patterns to move beyond an inefficient ‘one for you, one for me’ counting approach which teaching a sharing approach forces children into using. As such all Level 1 and 2 division should be taught through grouping only, and should mainly use patterns the children are very familiar with (i.e. 2s, 5s and 10s). Until sharing for division is introduced at level 3, the division sign should ALWAYS be read as ‘divided into groups of’ rather than ‘divided by’. This is SUCH an important idea!</p>				<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Grouping</p>  <p>4 fish can live in a bowl. How many bowls do 8 fish need?</p> </div> <div style="text-align: center;"> <p>Sharing</p>  <p>8 sweets shared between 4 children</p> </div> </div>
<p>Foundation Stage End of Year Early Learning Goal (ELG)</p>	<p>Records using marks that they can interpret and explain.</p>		<p>Share objects into equal groups and count how many in each group</p>	
<p>Level 1 Practise grouping and sharing in realistic class contexts. Practise counting in 2s, 5s and 10s</p>		<p>Models for grouping – supported skip counting</p>  <p>How many groups of 10 make 30?</p>	<p>Use 2s, 5s and 10s skip counting to answer questions such as “How many groups of 10 make 30?” with reference to manipulatives.</p>	<p>Instant recall</p> <ul style="list-style-type: none"> Halves of even numbers to 10
<p>Level 2 Practise counting in 3s Begin to use repeated addition to solve div problems Lots of practice reading $8 \div 4$ as “8 divided into groups of 4”</p>	<p>Repeated addition on a number line for less familiar counting patterns</p>  <p>$14 \div 3 = 4 \text{ r } 2$</p>	 <p>How many 5p pieces in 20p?</p>	<p>- Use counting up in 3s, 5s and 10s (using fingers to keep track of groups) to start to derive division facts presented as number sentences, e.g. $20 \div 5$</p>	<p>Instant recall</p> <ul style="list-style-type: none"> Halves of even numbers to 20, including recognising e.g. $14 \div 2$ as finding a half
<p>Level 3 -Start to use vocab of factors Children should be comfortable with concept of factors by L4 - Get children to visualise where 28 lies on e.g. a 5 tt counting stick, then identify how many groups of 5 can be made, plus remainder. N.B. Chn will need to be very familiar with Jill Mansergh method (see multiplicat' n)</p>	<p>‘Reverse grid’ approach Divide a 2 digit number by 2, 3, 4 and 5 to give a ‘teens’ answer E.g. $42 \div 3 = 14$</p>  <p>$42 \div 3 = 14$</p>	<p>Arrays</p>  <p>$16 \div 3 = 5 \text{ r } 1$</p>  <p>$42 \div 3$</p> <p>$30 = \text{ ___ groups of } 3$ $12 = \text{ ___ groups of } 3$</p>	<p>-Use half and half again for $\div 4$ -Divide whole numbers by 10 (whole number answers) -Calculate div facts with remainders for 2, 3, 4, 5 and 10 tt</p> <p>lottings to support mental chunking e.g. $2000 \div 250$ $2 \times 250 = 500$ $4 \times 250 = 1000$ $8 \times 250 = 2000$</p>	<p>Instant recall</p> <ul style="list-style-type: none"> Half of 30, 50, 70, 90 Begin to know division facts for 3, 4, 5 and 10 times table
<p>Level 4 -Working out division facts with remainders is often neglected. Chn need lots of practice. Can count up on fingers at first but should move to using tt facts asap. Essential prerequisite to bus stop.</p>	<p>Bus stop method for single digit division Divide a 2 or 3 digit number by a single digit</p>  <p>$159 \div 4 = 39 \text{ r } 3$</p>	<p>Counting Stick</p>  <p>$28 \div 5 = 5 \text{ r } 3$</p> <p>5 groups of 5 ... and 3 more</p> <p>Use Dienes to introduce bus stop method See separate sheet for fully worked through example</p>	<p>- Div whole numbers by 10 or 100 -Mental chunking for ‘simple’ calcs, e.g. Yoghurts cost 45p each; how many can I buy for £5?</p>  <p>$\pounds 5.00 = 11$ yoghurts $\pounds 4.50 = 10$ yoghurts 50p left so I can buy 1 more yoghurt</p>	<p>Instant recall</p> <ul style="list-style-type: none"> Half of 1, 3, 5, 7, 9 <p>Derived</p> <ul style="list-style-type: none"> Quickly derive division facts for tens up to 10×10, Div facts with remainders for all tt Division facts & place value calculations such as $180 \div 3$
<p>Level 5 - Children should be comfortable with concept of square roots</p>	<p>Bus stop method</p> <ul style="list-style-type: none"> Divide decimal numbers by a single digit, e.g. $31.62 \div 8$ Divide any 3 digit number by any 2 digit number using factorising, e.g. for $1652 \div 28$, do $1652 \div 4$, then $\div 7$ 		<p>-Multiply and divide decimals and whole numbers by 10, 100 and 1000 -Multiply a two digit number by a single digit</p>	<p>Derived</p> <ul style="list-style-type: none"> Division facts & place value calculations such as $1.8 \div 3$ or $1.8 \div 0.6$