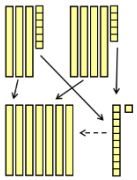
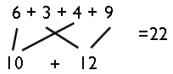
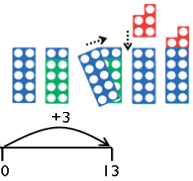
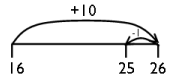
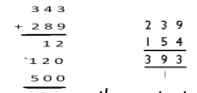
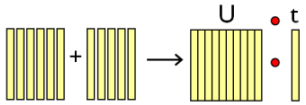
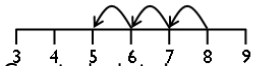
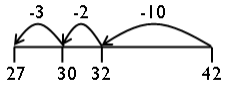
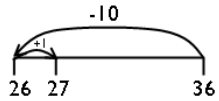
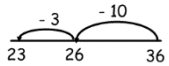
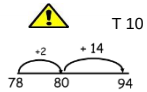
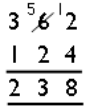
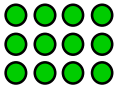
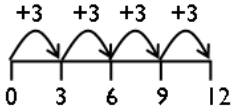
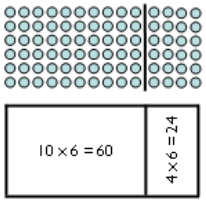
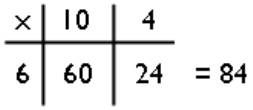
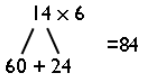
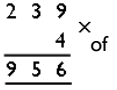
Ilminster Avenue E-ACT Academy – Progression in Teaching and Learning Addition

Level and Notes	Known Facts	Models & Images	Mental Calculations	Written Calculations
Foundation Stage Development Matters/ELGs	-Recognise some numerals of personal significance -Use a range of strategies for +, incl some recall of number stories	Select two groups of objects to make a given total of objects	-Find the total number of objects in two groups by counting them all -In practical activities & discussion, begin to use the vocab of addition	-Find one more than a number to 10 -In practical activities & discussion, begin to use the vocabulary involved in addition
Level 1 See Suffolk ENL - Essential to develop cardinal and ordinal representations of number in parallel - Understand + as finding the total of two or more sets of objects - Introduce 'How many more?'	**Instant recall** •Doubles of numbers to 5 eg 3 + 3 4 +4 •Story of 10 eg 7 + 3 and 3 + 7 **Instant calculation** •10 + U •Stories within 5 eg 3 + 1 **(Using combining rather than counting in 1s)**	**Cardinal** The 'eightness' of 8 5 + 3 = 8 Counting in 1s on a number line	Add numbers of objects to 10 - Begin to add by counting on from the number of objects in the first set	Record their work, e.g. - record their work with objects, pictures or diagrams -begin to use the symbols '+' and '=' to record L1 additions *-e.g. 10 + 5 = 15; 3 + ? = 7; 10 = 8 + 2* - Uses numbers up to 20
Level 2 - 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'	**Instant recall** •Doubles of numbers to 10 and corresponding halves eg double 8, halve 16 •Story of 20 eg 17 + 3 3 + 17 •Multiples of 10 which total 100 eg 80 + 20 **•Plus Level 1 Instant calculation** **Instant calculation** •Stories within 10 eg 7 + 2 •Add 10 to any number to 90 **(Model with Numicon)** eg 38 + 10 = 48	**Partitioning** (Numicon/Dienes)  36 + 45 = 81 **Bridging** - Teach with 8 sandwich then represent on number line	Begin to add multiples of 10 to a 2 digit number, e.g. calculate 26 + 30 **(By counting on in 10s or partitioning)** Record their work in writing, e.g. *- record their mental calculations as number sentences*	**Partitioning** Add two digit numbers using a written method, e.g. *– use written methods that involve bridging 10* 36 + 11 30 + 10 = 40 6 + 1 = 7 40 + 7= 47
Level 3 - Don't forget to show you can add more than 2 numbers in column addition - Look at adding strings of single digit numbers, e.g. 6 + 3 + 4 + 9 = by finding number bonds to 10 first 	**Instant recall** •Double 15, 25, 35, 45 and corresponding halves 30, 50, 70, 90 **•Plus Level 2 Instant calculation** **Instant calculation** •Stories within 20 eg 16 + 3 = 19 **(Derived using compensating, bridging or near doubles)** •Addition facts for multiples of 10, e.g. 70 + 90 = 160 •Multiples of 5 which total 100 eg 15 + 85	8 + 5 = 13  **Compensating – Higher L3** 16 + 9 = 25 	Stories of 100 eg 36 + 64 --- Add 2 digit numbers mentally, e.g. -Calculate 36 + 19 **(Partitioning, compensating, bridging or near doubles)** **(Counting on strategy)** --- Apply knowledge of story of 100 to add 3 digit numbers eg 264 + 436	**Column addition** Add three digit numbers involving bridging 10 or 100 ***Expanded*** *progressing to* ***Compact***  *-Add ... in the context of money where bridging is not required*
Level 4 -When working with money, teach that e.g. £2.99 + £5.99 can quickly be added mentally using compensating (£3 + £6 – 2p) -Chn should 'see' decimals so that they are not saying 0.5+0.6 = 0.11	**Instant recall** **•Plus Level 3 Instant calculation** **Instant calculation** •Number stories of 100 •Doubles of tenths to 0.9 and corresponding halves eg double 0.2 = 0.4 half of 0.4 is 0.2 •Addition facts for tenths up to 0.9, e.g. 0.7 + 0.9 = 1.6	**Column addition** Model using dienes to show the carrying into the next column **Addition facts for decimals** Introduce using dienes: 0.6+0.5=1.1	Calculation stories of 1000 for multiples of 10, e.g. 340 + ___ = 1000 --- Calculate stories of 10 using 1dp. e.g. 3.6 + __=10 Calculate stories of 1 using 2dp. 0.43 + __ = 1	**Column addition** Use efficient written methods of addition, e.g. *- calculate 1202 + 45 + 367* *- add decimals to 2 places*
Level 5	**Instant recall** **•Plus Level 4 Instant calculation** **Instant calculation** •Doubles of hundredths to 0.09 and corresponding halves •Addition facts for hundredths up to 0,09 e.g. 0.07 + 0. 09 = 0.16		Calculate decimal stories of 10 or 100 e.g. 2.33 + __ = 10 32.64 + __ = 100	

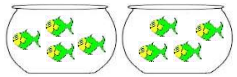
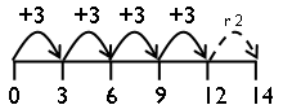
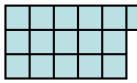
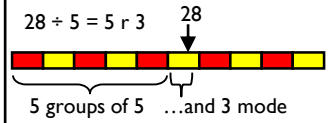
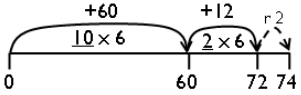
Ilminster Avenue E-ACT Academy – Progression in Teaching and Learning Subtraction

Level and Notes	Known Facts	Models & Images	Mental Calculations	Written Calculations
Foundation Stage Development Matters/ELGs	--Use a range of strategies for - incl some recall of number bonds	Select two groups of objects to make a given total of objects	-In practical activities & discussion, begin to use the vocabulary involved in subtraction	Finds one less than a number to 10
Level 1- See Suffolk ENL - Understand subtraction as 'taking away' objects from a set and finding how many are left	Instant recall • Halves of even numbers to 10 (link to undoing of doubles) • Know 'one less' than numbers to 20, e.g. 12 -1	Subtraction as taking away objects from a set  Counting back in 1s on a number line	- Subtract numbers of objects to 10 - Begin to subtract by counting back from the number of objects in the first set	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
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 + __ = 11 - Count in 10s and 1s first then, quickly move to more efficient jumps (see bridging pic) Make links with addition 10= 6+4 so 10 – 4 = 6 and 10-6=4	Instant recall • Halves of even numbers to 20 (link to undoing of doubles) • Subtraction stories of 10 (e.g.10 - 4 = 6) Instant Calculation • Subtraction stories within 10 (e.g. 9 - 2 = 7) • Subtract 10 from any number to 100 **(Model with Numicon)**	**Subtraction facts w/ Numicon** 9 = 6 + 3 9 - 3 = 6 **Subtracting 10 with Numicon** 25 - 10 = 15 Until chn can do this seamlessly, don't start on number line **Bridging**  **Compensating Higher L3** 	At top L2, start to see subtraction as counting on to derive subtraction facts to 20 ONLY WHEN numbers are very close , e.g. 19 – 17 = 2 Record their work in writing, e.g. *- record their mental calculations as number sentences*	**Counting back on number line** Subtract two digit numbers using a written method, e.g. 36 -13, (*including bridging 10*, e.g. 42 – 15) 
Level 3 -Build 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 - Higher L3 - 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)	Instant recall • Half of 90, 70, 50 and 30 • Subtraction stories of 20 (e.g. 20 – 3 = 17) • **Plus Level 2 Instant calculation** Instant Calculation • 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		Subtract 2 digit numbers mentally, e.g. -Calculate 63 - 26 **(Counting back or counting on incl using compensating or bridging where relevant)** -Subtraction Stories of 100, e.g. 100 - 64 **(Counting on strategy)**	Subtract three-digit numbers including bridging 10 or 100 **Counting back on a number line** (see L2) OR **Counting on on a number line** for numbers close together e.g. 94 – 78  Subtract decimals in the context of money where bridging not required
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	Instant recall • Half of 9, 7, 5 and 3 • **Plus Level 3 Instant calculation** Instant Calculation • Halves of decimals to 1 dp for even tenths, e.g. half of 5.8	**Column subtraction** Model exchanging using dienes, as shown fully on separate sheet. 	Continue to use counting on/ counting back for all calculations that can and should be done mentally e.g. £10.00 –£ 4.55 = 2003 – 1999 =	**Column subtraction** Use efficient written methods of subtraction, e.g. *- Calculate 1025 - 336* *- Subtract decimals to 2 places* 
Level 5 - Reinforcing alignment of dps for column subtraction. Show how chn can write in 0 for e.g. empty hundredths as place holder.	**Instant recall** •**Plus Level 4 Instant calculation** Instant Calculation • Halves of decimals to 1 dp for odd tenths, e.g. half of 5.7		Continue to use counting on/ counting back for all calculations that can and should be done mentally	

Ilminster Avenue E-ACT Academy – Progression in Teaching and Learning Multiplication

Level and Notes	Known Facts	Models & Images	Mental Calculations	Written Calculations
Foundation Stage Development Matters/ELGs		Repeated groups of the same size	Count repeated groups of the same size Respond to/make up number stories	Informal jottings, mathematical mark making,, problem solving process, use of blank paper
Level 1 Practise counting in 2s, 5s and 10s, including using visual images for support	Instant recall • Doubles of numbers to 5	**Numicon** Practise showing the difference between an addition sentence and a mult sentence 2+3 = 5 2x3 = 6 - Start to use arrays (See L2)		
Level 2 Practise counting in 3s Use repeated addition to solve multiplication problems	Instant recall • Doubles of numbers to 10 • Begin to know times table facts for 3, 5 and 10tt	**Arrays** 4 x 3 = 12  **Counting stick times tables** Watch Jill Mansergh vidoes in shared area	- 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'	**Repeated addition on a number line** e.g. 4 x 3 = 12 
Level 3 -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 -However, all should then be reinforced through consistent use of Jill Mansergh technique	Instant recall • 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 Instant calculation • Times table facts for 6, 7, 8 and 9tt (see notes) • Times tables & place value calculations such as 70 x 3	**'Rows of chairs in hall' (array) as visual representation of grid method** 	-Multiply a number by doubling and doubling again -Multiply a 2 digit whole number by 10	**Grid method** Multiply a 2 digit number by 2, 3, 4 5 & 6 14 x 6 = 84 
Level 4 - Recognise and describe number relationships, incl multiple, factors and squares	Instant recall • Recall multiplication facts up to 10 x 10 • Quickly derive corresponding division facts • **Plus Level 3 instant calculation** Instant calculation • Times tables & PV calculations with decimals such as 0.7 x 3	**Use Dienes to introduce short multiplication** See separate sheet for fully worked through example **Grid method** Extend grid method to use with a single digit x decimal	-Use place value to multiply a whole number by 10 or 100 -Multiply two multiples of 10 together, e.g. 40 x 30 **Partitioning** Multiply teens numbers by single digit by visualised partitioning  =84	**Short multiplication for single digit multiplication** - Use efficient methods of short multiplication  - Multiply a simple decimal by a single digit, e.g. 36.2 x 8 **Grid method** Extend grid method to use with a single digit x decimal as well
Level 5	Instant recall • Times tables & place value calculations such as 40 x 3 • **Plus Level 4 instant calculation** Instant calculation • Times tables & PV calculations with decimals such as 0.7 x 0.3		-Multiply decimals and whole number by 10, 100 and 1000 -Multiply a two digit number by a single digit	**Short multiplication or grid** Multiply decimal numbers by a single digit, e.g. 31.62 x 8 Multiply any 3 digit number by any 2 digit number

Ilminster Avenue E-ACT Academy – Progression in Teaching and Learning Division

Level and Notes	Known Facts	Models & Images	Mental Calculations	Written Calculations
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 ÷ 4, most people give a sharing example (sweets model rather than fish model in image below). However, mathematically grouping can be more useful for various reasons: 1) It is the inverse of the multiplication structure, 2) chunking on a number line uses grouping 3) it is much easier to divide a number INTO halves than between halves. Children need to use both structures, so 8 ÷ 4 should be routinely read as "8 divided/shared between 4 OR 8 divided into groups of 4" and children should practice saying and modelling both. The abstract "8 divided by 4"can be used once children have a solid understanding of grouping and sharing.				
Foundation Stage Development Matters/ELGs			Share objects into equal groups and count how many in each group	Informal jottings, mathematical mark making,, prob solving, blank paper
Level 1 Practise grouping and sharing in realistic class contexts. Practise counting in 2s, 5s and 10s	Instant recall • Halves of even numbers to 10	**Sharing** 8 sweets shared between 4 chn **Grouping** 4 fish can live in 1 bowl. How many bowls do 8 fish need? 		
Level 2 Practise counting in 3s Begin to use repeated addition to solve div problems Lots of practice reading 8 ÷ 4 as "8 divided/shared between 4 OR 8 divided into groups of 4"	Instant recall • Halves of even numbers to 20, incl recognising e.g. 14 ÷ 2 as finding a half		- Use counting up in 3s, 5s and 10s (using fingers to keep track of groups) to start to derive division facts phrased as 'how many groups of 3 in12?'	**Repeated addition on a number line** 14 ÷ 3 = 4 r 2 
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)	Instant recall • Half of 30, 50, 70, 90 • Begin to know division facts for 3, 4, 5 and 10 times table	**Arrays with remainders**  16 ÷ 2 = 5 r 1 **Counting stick** 28 ÷ 5 = 5 r 3 	-Use half and half again for ÷ 4 -Divide whole numbers by 10 (whole number answers) -Calculate div facts with remainders for 2, 3, 4, 5 and 10 tt **Jottings to support mental chunking** e.g. 2000 ÷ 250 2 x 250 = 500 4 x 250 = 1000 8 x 250 = 2000	**Chunking on a number line** Divide a 2 digit number by 2, 3, 4 and 5 with whole number answers and remainders e.g. 49 ÷ 3 74 ÷ 6 = 12 r 2 
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.	Instant recall • Half of 1, 3, 5, 7, 9 Instant calculation • Quickly derive division facts for tts up to 10 x 10, • Division facts with remainders for all tt • Division facts & place value calculations such as180 ÷ 3	**Use Dienes to introduce bus stop method** See separate sheet for fully worked through example	- 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? £5.00 = 11 yoghurts £4.50 = 10 yoghurts 50p left so I can buy 1 more yoghurt	**Bus stop method for single digit division** Divide a 2 or 3 digit number by a single digit 1 5 9 r 1 4 ⟌ 6 2 3 3 7
Level 5 - Children should be comfortable with concept of square roots	Instant recall **Plus Level 4 Instant calculation** Instant calculation • Division facts & place value calculations such as1.8 ÷ 3		-Multiply and divide decimals and whole numbers by 10, 100 and 1000 -Multiply a two digit number by a single digit	**Bus stop method** - Divide decimal numbers by a single digit, e.g. 31.62 ÷ 8 - Divide any 3 digit number by any 2 digit number