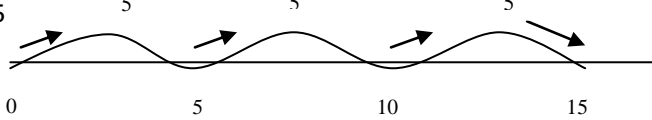




PROGRESSION IN MULTIPLICATION

As of September 2014 column headings will be read as HT1 alongside HTU

N.B - Numicon and its resources introduced January 2015 to support and enrich already established maths curriculum.

	Progression	Activities	Notes on vocabulary
0	Grouping practically and recording pictorially	pairs of socks, eyes legs of octopi	groups of pair
1a	COUNTING in 2s, 10s, 5s (regularly)	Counting stick hopping; 100 square patterns: move your finger to the next number; Numberline patterns - move your finger to next number;	
1b	Recording as an array 3 groups of 5 * * * * * * * * * * * * * * *	cubes, colouring square paper	array rows columns
1c	Link to doubling 2 groups of 6 is the same as double 6		double doubling
1d	Introduce symbol x		sign times multiply
2a	Multiplication is repeated addition 3 groups of 5 is 5+5+5	Investigation: (use calculator) is it always true that x is the same as lots of adding? E.g. Is 4 x 7 the same as 7+7+7+7?	number sentence repeated addition
2b	Numberline hopping 3 groups of 5 3 x 5 	RULE: always start at 0 and make the hops the same size.	
2c	Multiplication is reversible (commutative) 3 groups of 5 = 5 groups of 3 3 x 5 = 5 x 3 arrays * * * * *      * * * * * * * *      * * * * * * * *      * * * * * * * * * <u>or numberline hopping</u> '6 x 5 lands you at the same place as 5 x 6'.	Investigation: (with calculator) Is it always true that you can multiply in any order? E.g. is 345 x 567 = 567 x 345?	"You can multiply in any order"

2d	Further regular counting Inc. in 1/2 (if ready)	counting stick	
2e	Multiplication tables - Build them be repeatedly adding - memorising at least 3 facts e.g. 2 x 5, 5 x 5 and 10 x 5 (be able to access somewhere in the middle) - progress from 10s, 5s, 2s	e.g. groups of 2 (socks); counting stick - moving backwards and forwards; Bingo (facts); Multiplication converters (chn make them?).	tables multiples
3a	Multiply by Partitioning slightly larger numbers  3 x 14 = 3 groups of 14 Use Dienes' 1**** 1**** 1**** recorded 3 x 10 = 30 3 x 4 = <u>12</u> <u>42</u>	Popping Dienes into a tin - children see 14, 14, 14 going in but cannot see them, they must visualise the partitioning and then add	tens (units) ones
<b>We have decided to drop the grid method as pupils will already be using column recording in + and - and this interim stage is therefore not required. Should some children need this interim stage we shall use it for them.</b>			
3b	Further Tables Multiplication square - systematically organised		
3c	Know that multiplication and division are linked (maybe use term inverse)  <div style="display: flex; align-items: center; justify-content: center;"> <div style="text-align: center; margin-right: 20px;"> <math display="block">\begin{array}{r} 12 \\ \times \\ \hline 4 \end{array}</math> </div> <div style="text-align: center; margin-right: 20px;"> <math display="block">\begin{array}{r} 12 \\ \div \\ \hline 3 \end{array}</math> </div> <div> <math display="block">3 \times 4 = 12</math>  <math display="block">4 \times 3 = 12</math>  <math display="block">12 \div 3 = 4</math>  <math display="block">12 \div 4 = 3</math> </div> </div>		inverse operation product
3d	REGULAR COUNTING inc. 1/2, 1/4		
3e	Know 'anything' x 0 = 0  e.g. 3 x 0 = 0, 2458 x 0 = 0, 1/2 x 0 = 0		
4a	Know Multiplication and Division are inverse operations  <u>Investigation:</u> Take any number, multiply it by any 2nd number, and write down the answer. Now start with the answer, divide it by the 2nd number used, do you always get back to the number you started with?  e.g. 4 x 5 = 20; 20 ÷ 5 = 4 [Could use a calculator to investigate the truth of this for huge numbers - especially for more able. e.g. 1367 x 5789 = ? ÷ 5789 = 1367]		
4b	<u>Investigation:</u> Rectangle numbers 1. Use cubes to make as many different rectangles for a given number e.g. 6 [2 x 3, 3 x 2, 6 x 1, 1 x 6]. SO: 1, 2, 3 and 6 can divide into 6 (factors) / 6 can be divided by 1,2,3,6 / 6 is in the 1, 2, 3 and 6 times tables. 2. What about 5 and 7? Only one shape, 1 and itself (prime numbers) 3. What about 9 and 16? Several shapes but one of them is a square (square numbers)		
4c	Harder multiplication T1 x 1 (TU x U)		brackets

	<p>Stage 1: Using mental methods and horizontal recording</p> $38 \times 7 = 7 \times 38 = 7 \times (30 + 8)$ $= 210 + 56 = 266$ <p>Stage 2: Column recording- expanded method</p> $\begin{array}{r} 38 \times 7 \quad 38 \\ \times \quad 7 \\ \hline 56 \quad (7 \times 8) \\ 210 \quad (7 \times 20) \\ \hline 266 \quad (7 \times 38) \end{array}$		
4d	Multiplication square - in mixed order		
4e	Harder Counting Inc. $\frac{1}{2}$ , $\frac{1}{4}$ , $\frac{1}{10}$ , $\frac{1}{5}$ , $\frac{1}{3}$ etc.		
4f	Multiplication by 10 $32 \times 10 = 320$  RULE: one zero so one jump.	Children hold numbers and column jump one place to the left, use zero as place holder	
4g	Multiplication and division by 10, 100 (1000) (no decimals) $32 \times 10 = 320$ $4200 \div 100 = 42$ RULE: the number of jumps = the number of zeros.	Human numbers (as above) - all jump one/two (three) places to the left (x) or right ( $\div$ ), use zeros as place holders where necessary.	
4h	Multiplication of money  e.g. $\text{£}3.12 \times 3$  $\begin{array}{r} \text{£. T 1} \\ 3.12 \\ \times \quad 3 \\ \hline .06 \quad (3 \times 2\text{p}) \\ .30 \quad (3 \times 10\text{p}) \\ + 9.00 \quad (3 \times \text{£}3) \\ \hline 9.36 \end{array}$		
4i	<p>Investigation: in how many ways can you..... (This type of investigation requires teaching of how to record systematically, changing <u>one</u> variable at a time as in science.)</p> <p>e.g. In how many ways could you dress to leave the house if you had 3 hats (R, G, Y) and 2 coats (B, P)</p> <p style="text-align: center;">Hat Coat R B R P G B G P Y B Y P</p> <p>So 6 ways (number of ways is usually found by multiplying the two number: 3 colour hats x 2 colour coats = 6)</p>		

4j	Multiplication and division by 10, 100 (1000) (with decimals) $43 \div 10 = 4.3$ $123.4 \times 100 = 12340$ RULE: the number of jumps = the number of zeros.	as above	
4k	Compact Standard short multiplication  $\begin{array}{r} 38 \times 7 \\ \phantom{38} \times \phantom{7} \\ \hline 266 \\ \phantom{266} \phantom{7} \\ \hline \phantom{266} \phantom{7} \phantom{5} \end{array}$		carry the 5 tens
4l	Expanded long multiplication (For ablest only) T1 x T1 (TUxTU)  e.g. $56 \times 27$ Stage 1: mental methods, record horizontally = $(50 \times 20) + (50 \times 7) + (6 \times 20) + (6 \times 7)$ $= 1000 + 350 + 120 + 42$  Stage 2: column long format $\begin{array}{r} 56 \\ \times 27 \\ \hline 42 \text{ (7 x 6)} \\ 350 \text{ (7 x 50)} \\ 120 \text{ (20 x 6)} \\ \hline 1000 \text{ (20 x 50)} \\ \hline 1512 \end{array}$		
	Compact standard long multiplication - we leave for the middle school		