YEAR 5	Multiplication

Vocabulary: product, lots of, groups of, times, as much, factor, common factors, multiple, prime, prime number, prime factors, composite numbers, square, cube (see previous year groups)

Concrete	Pictorial	Abstract
X10, X100 and x1000: (as year 4 but extend to decimals to 2 places) Use place value chart with counters if needed (see year 4)	**X10, X100 and x1000:** e.g. 23.05 x 100 	**X10, X100 and x1000:** No written method – leads to a mental method.

Up to 4 digit numbers x 1 digit:
 	
(start with no exchanging leading to exchanging)
1325 x 4
 	
(if needed)
	Up to 4 digit numbers x 1 digit:
	
	No jottings
		Up to 4 digit numbers x 1 digit:
		
		Th H T O
		  1 3 2 5
		X 4
		  5 3 0 0
		   1 1 2

The place value chart shows:

Th	H	T	O	• ths	hths
		2	3	• 0	5
2	3	0	5	•	

2 digit x 2 digit (area model)	2 digit x 2 digit (area model)	2 digit x 2 digit (area model)
44 x 32 = 1408		$\begin{array}{r} 1200 \\ 120 \\ 80 \\ + 8 \\ \hline 1408 \\ 1 \end{array}$
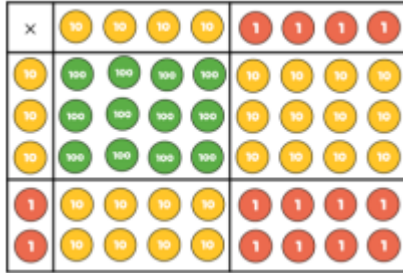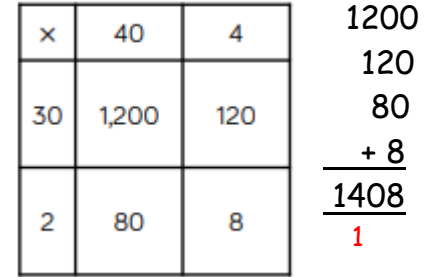
WRITTEN METHODS (not area model)
Progressive – start with no or limited exchanging leading to exchanging.

2 digit x 2 digit numbers:	3 digit x 2 digit numbers:	4 digit x 2 digit numbers:
Expanded	Th H T O	TTh Th H T O
$\begin{array}{r} 31 \\ X\ 25 \\ \hline 5\ (5x\ 1) \\ 150\ (5 \times 30) \\ 20\ (20 \times 1) \\ \underline{600}\ (20 \times 30) \\ \underline{775} \end{array}$ **Compacted** $\begin{array}{r} 31 \\ \times 25 \\ \hline 1\ 55 \\ \underline{6\ 20} \\ 7\ 55 \end{array}$	$\begin{array}{r} 1\ 3\ 2 \\ \times\quad 1\ 3 \\ \hline 3\ 9\ 6\ (132 \times 3) \\ \underline{1\ 3\ 2\ 0}\ (132 \times 10) \\ 1\ 7\ 1\ 6 \\ 1 \end{array}$	$\begin{array}{r} 3\ 2\ 5\ 0 \\ \times\quad\ 2\ 6 \\ \hline 1\ 9\ 5\ 0\ 0\ (3250 \times 6) \\ \ \ 1\quad 3 \\ 6\ 5\ 0\ 0\ 0\ (3250 \times 20) \\ \ \ \ 1 \\ \hline 8\ 4\ 5\ 0\ 0 \\ \ \ \ 1 \end{array}$
Initially ,some children may need to break this down further: $\begin{array}{r} 31 \\ \times\ 5 \\ \hline 1\ 5\ 5 \end{array}\quad \begin{array}{r} 31 \\ \times\ 20 \\ \hline 6\ 2\ 0 \end{array}\quad \begin{array}{r} 155 \\ +\ \underline{620} \end{array}$		

Multiply numbers with up to one decimal place by one-digit whole number.	Multiply numbers with up to one decimal place by one-digit whole number.	Multiply numbers with up to one decimal place by one-digit whole number.
Exchanging: 2.3 x 4 **Ones** ● **Tenths** Start with no exchanging leading onto exchanging.		$\begin{array}{r} 2.3 \\ \times\ 4 \\ \hline 1.2 \\ 8.0 \\ \hline 9.2 \end{array}$ $\begin{array}{r} 2.3 \\ \times\ 4 \\ \hline 9.2 \\ 1 \end{array}$ **Alternative grid method:** <table><tr><td>X</td><td>4</td></tr><tr><td>2.0</td><td>8.0</td></tr><tr><td>0.3</td><td>1.2</td></tr></table> 8.0 + 1.2 = 9.2 **Leads on to a mental method (see below)**

Mental Methods

Number facts:	**Doubling:**	**Partitioning:**
Continue to recall multiplication facts for multiplication tables up to 12 x 12. Derive and use related facts. 7 groups of 8 multiply 12 by 9 the product of 80 and 40 0.6 multiplied by 4 Use knowledge of counting in multiples to count in decimals steps (one decimal place) 0.6, 1.2, 1.8, 2.4 … 8.4, 7.7, 7, 6.3 …	Derive doubles of decimals (to one decimal place) using knowledge of place value Double 0.4 = 0.7 x 2 = Double 3.8 = 5.6 + 5.6 = 3.7 x 4 (double and double again) Double 3.7 is 7.4, double 7.4 is 14.8 76 x 50 (multiply by 100 and halve) 76 x 100 = 7600 Half of 7600 is 3800	1.2 x 7 = 8.4 1 x 7=7 0.2 x 7 = **1.4** **7 + 1.4** = 8.4 3.5 x 7 3 x 7 = **21** 0.5 x 7 = **3.5** **21 + 3.5** = 24.5 **Estimating and checking:** Check 86 x 9 by using and equivalent calculation.

X10, x 100 and x1000:	Using factors	Multiply by 10 and adjust (860 - 86) or
Multiply whole and decimal numbers by 10, 100 and 1000 where the answers are up to 2 decimal places. **Using Known facts and place value** 13 x 19 13 x 20 = 260 so 13 x 19 = 247 (subtract 26 from 260) 3 x 14 recognise 3 x 14 is equivalent to 6 x 7	25 x 12 = 25 x 2 x 6 25 x 2 = 50 50 x 6 = 300	partition (80 x 9 added to 6 x 9)