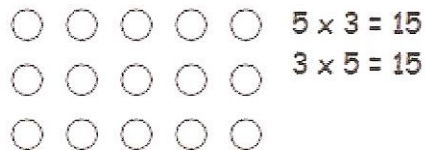# Calculation Progression for Multiplication

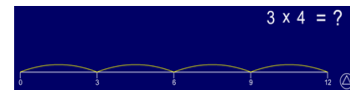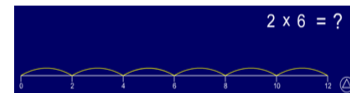|	Principle	Example
Yr 1	Solving one-step problems using concrete objects	In real contexts, solve one-step problems, each child will need two coloured pencils, how many will we need altogether?
	Arrays	In real contexts, introduce layout of arrays, in rows and columns
	Develop understanding of arrays, moving to abstract representation	5 x 3 = 15 3 x 5 = 15 Focus on the array, NOT on the formal recorded mathematical statement. Read as lots of, sets, groups
	Solve open-ended questions with arrays	Here are 20 counters. How could you arrange them in equal rows? How could you use a number sentence to show your arrangement?
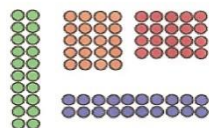
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- **Repeated addition**

Yr 1/2 — **Repeated Addition** - Teacher demonstrates how to use numberline to display repeated addition.

Show me on a number line how you could do:

3 x 4 = ? — 3 ×4, how would 4 x 3 be different?

2 x 6 = ? — 2 ×6, how would 6 x 2 be different?

4 +4 +4 +4 +4 =20
Write this addition fact as a multiplication fact.

☐ x ☐ = ☐

Children review **multiplication as repeated addition** by counting hops on a number line. For example, they find 6 fours by making 6 hops of 4.
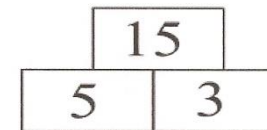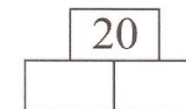

Yr 2 — **Use multiplication facts for x2, x5, x10** — Introduce x, = signs and their meanings. Discuss = as balancing, one side is the same value as the other. Use scales to demonstrate when appropriate

Introduce other forms of pictorial problem solving

5 x 3 = 15
3 x 5 = 15

☐ x ☐ = 20

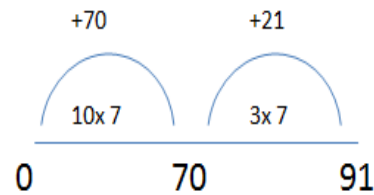Use partitioning to multiply 2 digit by 1 digit –

13 x 7

10 x 7 = 70
3 x 7 = 21

Add 70 + 21

Use place value equipment, numicon, dienes, straws etc for visual images
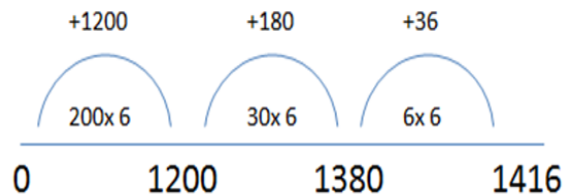
Yr 3

Unstructured numberline multiplication

multiply 2 digit by 1 digit

13 x 7

+70   +21

10x 7   3x 7

0   70   91

Yr 4

Multiply 3 digit by 1 digit

When the numbers get bigger, it is inefficient to do lots of small jumps. This starts when you do TUxU or HTUxU

236 x 6

+1200   +180   +36

200x 6   30x 6   6x 6

0   1200   1380   1416

Grid Method

This should be introduced when progressing onto TUxTU, HTUxTU and HTUxHTU.

8 x 23

x	20	3
8	160	24

T   U

160
+   24
184

Children should be secure with what happens to place value when multiplying by 10. Further development of this would lead to 2 digit by 2 digit multiplication.

This can be expanded for using decimals. Again introduce using money problems.

The addition can be done using numberline or column methods.

84 x 23

	x	20 (T)	3 (U)
T	80	1600	240
U	4	80	12

1600
240
+   80
12
1932
1

Yr 5

Multiply up to 4 digits by 1 or 2 digit numbers using grid method, 2 digit by 2 digit using long multiplication

84 x 237

	x	200 (H)	30 (T)	7 (U)
T	80	16000	2400	560
U	4	800	120	28

16000
2400
560
+   800
120
28
19908
1 1

Expanded Column Multiplication
Column multiplication should only be progressed onto when grid method is totally secure. 'Carrying over' should be embedded from previous addition work. As it involves column addition this should not be used unless this is secure

Expanded method of long multiplication

```
        Th    H    T    U
                  7    2
   x              3    8
              1   6         (8  x   2)
         5    6   0         (8  x  70)
              6   0         (30  x   2)
   2     1    0   0         (30  x  70)
   2     7    3   6
```
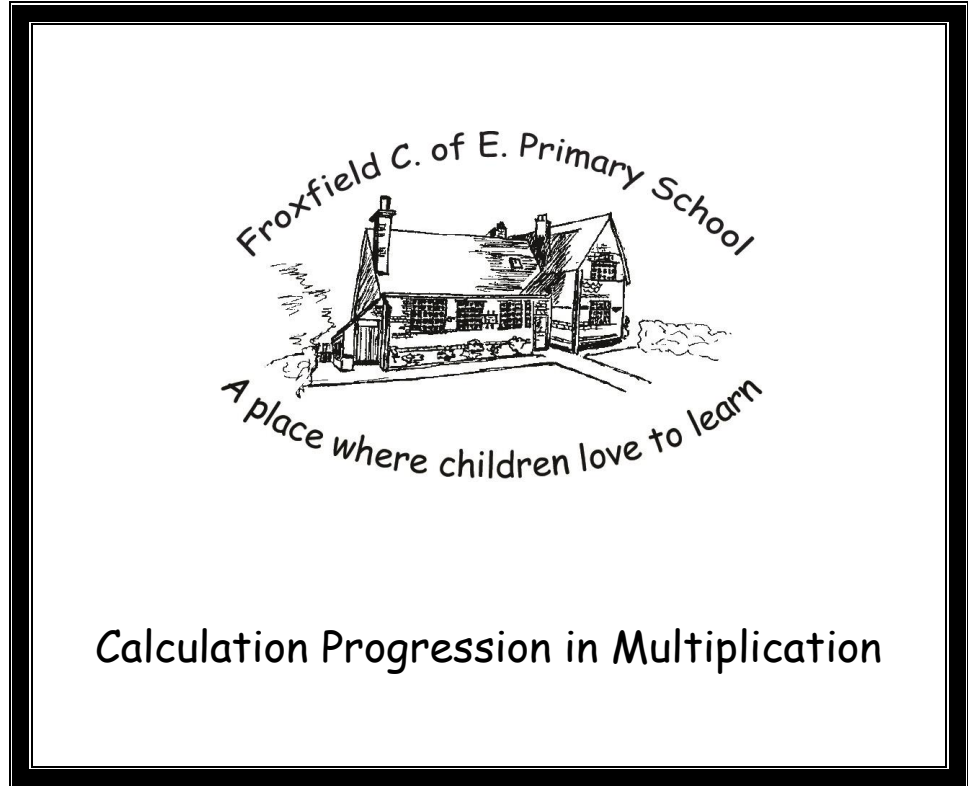
Column Multiplication
Carrying should be top left of number.
Don't forget to leave a 0 at start of line for 10's and up.

Long multiplication:

THTU x TU

For example,

```
         Th   H    T    U
         2    3    5    2
   x                2    7
    1    6    4    6    4      (7  x     2  3  5  2)
    4    7    0    4    0      (2  0  X 2  3  5  2)
    6    3    5    0    4
    1         1
```

Froxfield C. of E. Primary School

A place where children love to learn

Calculation Progression in Multiplication