PROGRESSION THROUGH CALCULATIONS FOR MULTIPLICATION

MENTAL CALCULATIONS

Doubling and halving

Applying the knowledge of doubles and halves to known facts.
e.g. 8 x 4 is double 4 x 4

Using multiplication facts

Tables should be taught everyday from Y2 onwards, either as part of the mental oral starter or other times as appropriate within the day.

Year 2
- 2 times table
- 5 times table
- 10 times table

Year 3
- 2 times table
- 3 times table
- 4 times table
- 5 times table
- 8 times table
- 10 times table

Year 4 Derive and recall all multiplication facts up to 12 x 12

Years 5 & 6 Derive and recall quickly all multiplication facts up to 12 x 12.

Using and applying division facts

Children should be able to utilise their tables knowledge to derive other facts.

e.g. If I know 3 x 7 = 21, what else do I know?
30 x 7 = 210, 300 x 7 = 2100, 3000 x 7 = 21 000, 0.3 x 7 = 2.1 etc

Use closely related facts already known

13 x 11 = (13 x 10) + (13 x 1)
= 130 + 13
= 143

Multiplying by 10 or 100

Knowing that the effect of multiplying by 10 is a shift in the digits one place to the left.
Knowing that the effect of multiplying by 100 is a shift in the digits two places to the left.

Partitioning

23 x 4 = (20 x 4) + (3 x 4)
= 80 + 12
= 102

Use of factors

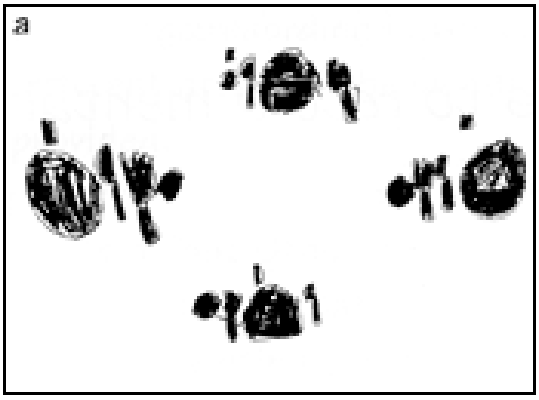
8 x 12 = 8 x 4 x 3

MANY MENTAL CALCULATION STRATEGIES WILL CONTINUE TO BE USED. THEY ARE NOT REPLACED BY WRITTEN METHODS.

THE FOLLOWING ARE STANDARDS THAT WE EXPECT THE MAJORITY OF CHILDREN TO ACHIEVE.

YR and Y1

Children will experience equal groups of objects and will count in 2s and 10s and begin to count in 5s. They will work on practical problem solving activities involving equal sets or groups.



Y2

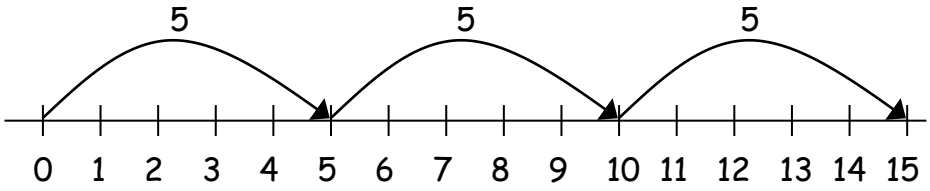
Children will develop their understanding of multiplication and use jottings to support calculation:

- ✓ **Repeated addition**

3 times 5 is 5 + 5 + 5 = 15 or 3 lots of 5 or 5 x 3

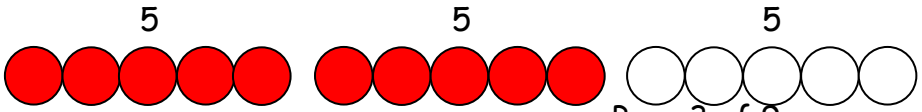
Repeated addition can be shown easily on a number line:

5 x 3 = 5 + 5 + 5



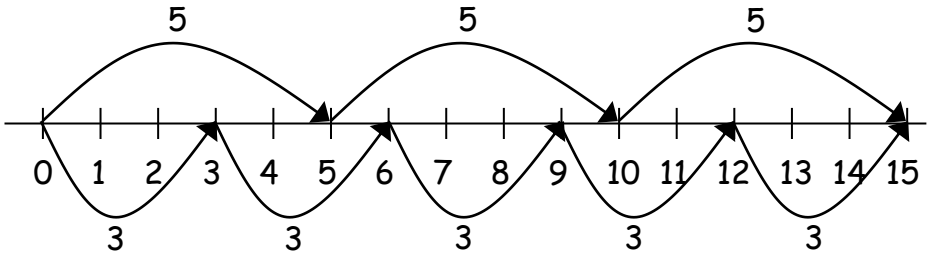
and on a bead bar:

5 x 3 = 5 + 5 + 5



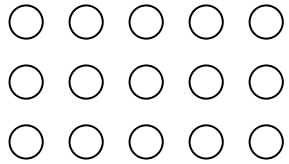
✓ **Commutativity**

Children should know that 3 x 5 has the same answer as 5 x 3. This can also be shown on the number line.



✓ **Arrays**

Children should be able to model a multiplication calculation using an array. This knowledge will support with the development of the grid method.



5 x 3 = 15

3 x 5 = 15

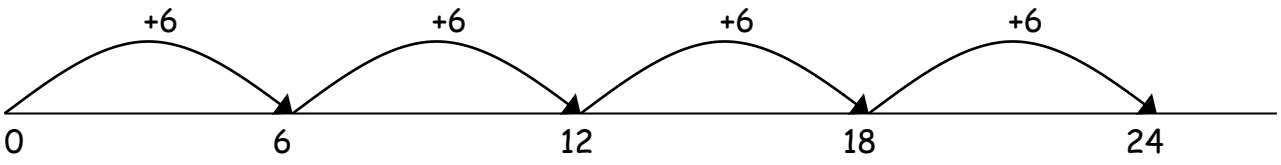
Y3

Children will continue to use:

✓ **Repeated addition**

4 times 6 is 6 + 6 + 6 + 6 = 24 or 4 lots of 6 or 6 x 4

Children should use number lines or bead bars to support their understanding.



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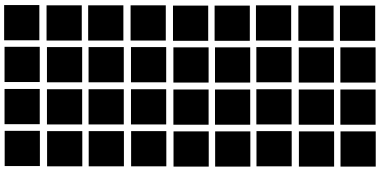


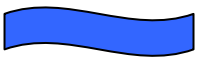
9 x 4 = 36

9 x 4 = 36

Children will also develop an understanding of

✓ **Scaling**

e.g. Find a ribbon that is 4 times as long as the blue ribbon



5 cm

20 cm

✓ **Using symbols to stand for unknown numbers to complete equations using inverse operations**

□ x 5 = 20 3 x △ = 18 □ x O = 32

✓ **Partitioning**

38 x 5 = (30 x 5) + (8 x 5)
= 150 + 40
= 190

Y4

Column method

TU x U
(Short multiplication – multiplication by a single digit)

46 x 5

Children will approximate first = 50 x 5 = 250

```
  46
x  5
  30   (5 x 6 = 30)
200   (5 x 40 = 200)
230
```

This will then progress to a shortened method:

```
  46
x  5
 230
 ~~23~~
```

Y5

HTU x U
(Short multiplication – multiplication by a single digit)

346 x 9

Children will approximate first
346 x 9 is approximately 350 x 10 = 3500

```
 346
x  9
3114
~~45~~
```

TU x TU
(Long multiplication – multiplication by more than a single digit)

72 x 38

Children will approximate first
72 x 38 is approximately 70 x 40 = 2800

```
  72
x 38
 576
+ 51
2160
 21
2736
```

Using similar methods, they will be able to multiply decimals with one decimal place by a single digit number, approximating first. They should know that the decimal points line up under each other.

e.g. 4.9 x 3

Children will approximate first
4.9 x 3 is approximately 5 x 3 = 15

```
 4.9
x  3
14.7
 12
```

Y6

ThHTU x U
(Short multiplication – multiplication by a single digit)

4346 x 8

Children will approximate first
4346 x 8 is approximately 4346 x 10 = 43460

4346

$$\begin{array}{r} \times \quad 8 \\ \hline 34768 \\ \hline \end{array}$$

2 3 4

HTU x TU
(Long multiplication – multiplication by more than a single digit)

372 x 24

Children will approximate first
372 x 24 is approximately 400 x 25 = 10000

$$\begin{array}{r} 372 \\ \times\ 24 \\ \hline 1488 \\ +1\,1\,2 \\ 7440 \\ 1 \\ \hline \mathbf{8928} \\ 1 \end{array}$$

1

Using similar methods, they will be able to multiply decimals with up to two decimal places by a single digit number and then two digit numbers, approximating first.
For example:

4.92 x 3

Children will approximate first
4.92 x 3 is approximately 5 x 3 = 15

$$\begin{array}{r} 4.92 \\ \times\ 3 \\ \hline 12.76 \\ 1\,2 \end{array}$$

+ - + - + - + - + - + - +

By the end of year 6, children will have a range of calculation methods, mental and written. Selection will depend upon the numbers involved.

Children should not be made to go onto the next stage if:

1) **they are not ready.**
2) **they are not confident.**

Children should be encouraged to approximate their answers before calculating.

Children should be encouraged to consider if a mental calculation would be appropriate before using written methods.