Shotton Hall Primary School
Working together to
S H I N E
Successful, Happy, Inspired and Nurtured towards Excellence

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Next Review: September 2019
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Signed:

RRSA Links

- Article 28 - Every child has the right to an education.

- Article 29 - Education must develop every child's personality, talents and abilities to the full. It must encourage the child's respect for human rights, as well as respect for their parents, their own and other cultures and the environment.

The following strategies are used in the teaching of multiplication in Maths. They are also supported by additional strategies which are suggested in the White Rose Teaching for Mastery documents.

PROGRESSION THROUGH CALCULATIONS FOR MULTIPLICATION

MENTAL CALCULATIONS
(ongoing)
These are a **selection** of mental calculation strategies:

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
	6 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)
$\qquad$ = 130 + 13
$\qquad$ = 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)
$\qquad$ = 80 + 12
$\qquad$ = 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.

EARLY STAGES (EYFS)

Children will engage in a wide variety of songs and rhymes, games and activities.
In practical activities and through discussion they will begin to solve problems involving doubling.

'Three apples for you and three apples for me. How many apples altogether?'

# Y1

Statutory requirements

Pupils should be taught to:

· solve one-step problems involving multiplication, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.

● Pictorial recording as children develop understanding of repeated addition, e.g. counting in sets of two, e.g. sets of two pence coins, five, e.g. tally bundles, tens, e.g. sets of 10 pennies.
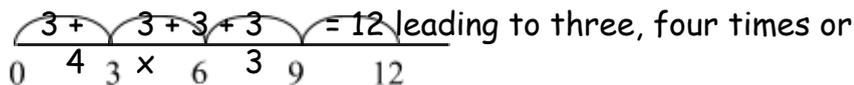

● Use of arrays to illustrate repeated addition.

O O O O $4 + 4 + 4 = 12$

O O O O

O O O O

$3 + 3 + 3 + 3 = 12$
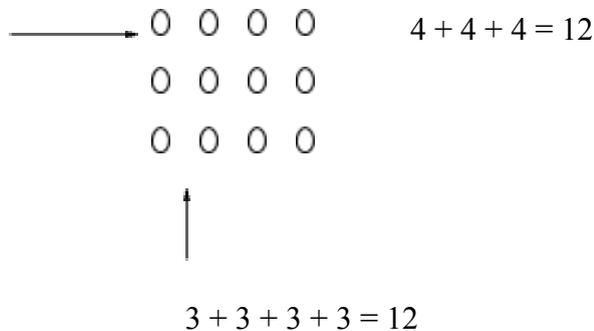
● Record repeated addition on a number line

e.g. for the array above,

     $4 + 4 + 4 = 12$ leading to four, three times or 4 x 3

$3 + 3 + 3 + 3 = 12$ leading to three, four times or 3×4

Using such models will help develop children's understanding of the commutativity of multiplication,

e.g. 6 x 2 = 2 x 6

Y2

Statutory requirements
Pupils should be taught to:
• recall and use multiplication facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
• calculate mathematical statements for multiplication within the multiplication tables and write them using the multiplication (×) and equals (=) signs
• show that multiplication of two numbers can be done in any order (commutative)

Children will develop their understanding of multiplication and use jottings to support calculation
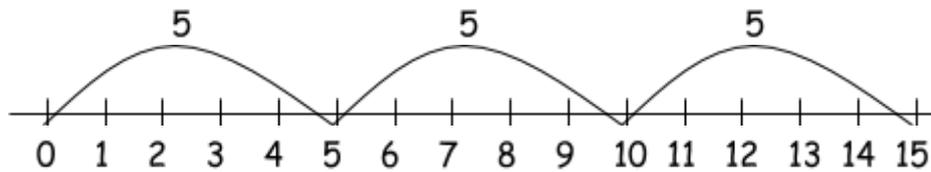
✓
✓ **Repeated addition**

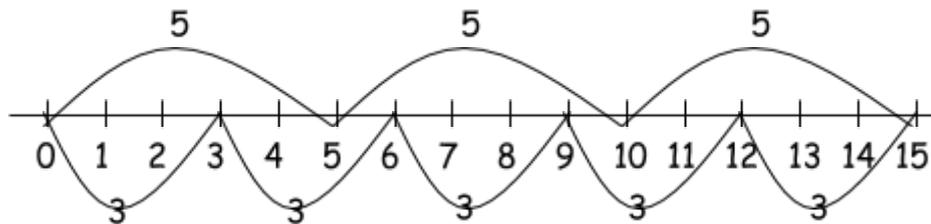3 times 5   is   5 + 5 + 5 = 15   or   3 lots of 5   or   5 × 3

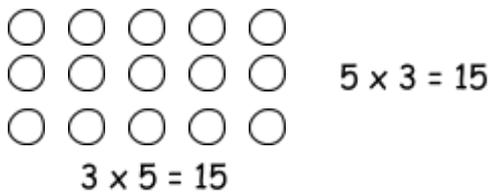Repeated addition can be shown easily on a number line:

5 × 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.

$5 \times 3 = 15$

$3 \times 5 = 15$

Children will also develop an understanding of

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

☐ x 5 = 20   3 x △ = 18   ☐ x ○ = 32

Remember:

Year 3 to Year 6

Before the introduction of formal written methods for multiplication, children should be able to:

- recall multiplication facts for the tables used;
- partition numbers into multiples of one hundred, ten and one;
- work out products such as 70×5, 70×50, 700×5 or 700×50 using the related fact 7×5 and their knowledge of place value;
- add two or more single-digit numbers mentally;
- add multiples of 10 (such as 60 + 70) or of 100 (such as 600 + 700) using the related addition fact, 6 + 7, and their knowledge of place value;
- add combinations of whole numbers using the column method.

Y3

Statutory requirements
Pupils should be taught to:
· recall and use multiplication facts for the 3, 4 and 8 multiplication tables
· write and calculate mathematical statements for multiplication using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods

Children will continue to develop an understanding of

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

☐ x 5 = 20   3 x △ = 18   ☐ x ○ = 32

Children will continue to use arrays where appropriate leading into the grid method of multiplication.

Grid method

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

23 x 8

Children will approximate first
23 x 8 is approximately 25 x 8 = 200

x	20	3
8	160	24

$$\begin{array}{r} 160 \\ +\ \ 24 \\ \hline 184 \end{array}$$

Children will then be introduced to the compact method, at first with no 'carrying', then with 'carrying' onto the 'doorstep'.

$$\begin{array}{r} 2\ 3 \\ \times\ \ 3 \\ \hline 6\ 9 \end{array}$$ $$\begin{array}{r} 2\ 3 \\ \times\ _2\ 8 \\ \hline 184 \end{array}$$

Y4

Statutory requirements
Pupils should be taught to:
·   multiply two-digit and three-digit numbers by a one-digit number using formal written layout

Grid method may continue to be used at the beginning of the year, however, move children to short method of multiplication as soon as possible.

24 × 6 becomes

```
        2   4
    ×       6
  ─────────────
    1   4   4
        2
```

Answer: 144

342 × 7 becomes

```
    3   4   2
    ×       7
  ─────────────
    2   3   9   4
        2   1
```

Answer: 2394

*Examples taken from National Curriculum. Please note that carrying figures are to be placed on the doorstep.

Y5

Statutory requirements
Pupils should be taught to:
• multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers
• multiply whole numbers and those involving decimals by 10, 100 and 1000

Compact method will now be secure as form of recording multiplication. Long multiplication will be introduced when appropriate (TU x TU).

24 × 6 becomes

```
        2   4
    ×       6
  ─────────────
    1   4   4
        2
```

Answer: 144

342 × 7 becomes

```
    3   4   2
    ×       7
  ─────────────
    2   3   9   4
        2   1
```

Answer: 2394

2741 × 6 becomes

```
    2   7   4   1
    ×           6
  ─────────────────
    1   6   4   4   6
            4   2
```

Answer: 16 446

*Examples taken from National Curriculum. Please note that carrying figures are to be placed on the doorstep.

```
        2   7
    ×  ₂3₂4
  ─────────────
    1   0   8
  + 8   1   0
  ─────────────
    9   1   8
```

Y6

Statutory requirements
Pupils should be taught to:
• multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication

Compact method of multiplication will continue to be used (short and long).

```
124 × 26 becomes
          1   2
      1   2   4
  ×       2   6
  ───────────────
      7   4   4
  2   4   8   0
  ───────────────
  3   2   2   4
  ───────────────
  1   1

  Answer: 3224
```

*Examples taken from National Curriculum. Please note that carrying figures are to be placed on the doorstep.

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

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.