Written methods for multiplication

Mauldeth Road Primary School

July 2013

Do not introduce multiplication or times tables until your child is secure with repeated addition.

If you are not certain then please check with the class teacher.

Written methods for multiplication

The aim is that children use mental methods when appropriate, but for calculations that they cannot do in their heads they use an efficient written method accurately and with confidence.

It is important that children practise and become confident in each method of calculation before moving on.

Mental multiplication using partitioning

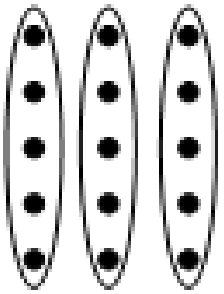
Early stages of multiplication involves counting in different steps e.g. counting pairs of socks, counting 10p coins etc.

- Repeated addition using apparatus or diagrams.
- Children experience lots of practical activities and concentrate on x2, x5 and x10.
- Sequences—counts aloud in jumps of 2, 5,10:

2, 4, 6, 8, 10 ...
5, 10, 15, 20, 25 ...
10, 20, 30, 40 ...

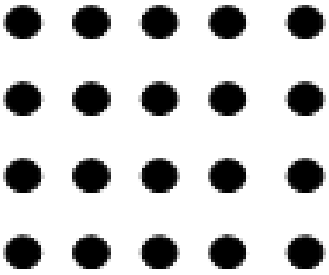
- Mental methods for multiplying can be completed using arrays, firstly with pictures and then with dots.
- Talk to your child about the different ways the calculation can be expressed e.g.. '5 lots of 4' or '4 lots of 5'.
- Move on to record the calculation as a number sentence e.g. 5 x 4 = 20 or 4 x 5 = 20.

Children will need to know their times tables to progress to the next stage.



= 15

5 + 5 + 5



5 x 4 = 20

or

4 x 5 = 20

The grid method

- This method is useful when multiplying numbers that can not be multiplied mentally.
- Partition the two-digit number into tens and units and multiply by the one digit number.
- Encourage your child to use facts they already know to complete the calculation e.g. for 20 x 4, they know that 2 x 4 is 8, so 20 x 4 must be 10 times bigger, therefore it equals 80.
- Multiply the units together e.g. 4 x 3 = 12.
- Then add the component parts of the calculation.
- It is better to place the number with the most digits in the left-hand column of the grid so that it is easier to add the parts of the calculation at the end, but it can be completed either way (see example).

$23 \times 4 =$

x	20	3
4	80	12

= 92

or

x	4	
20	80	
3	12	
	92	

Expanded short multiplication

- The next step is to represent the method of recording in a column format, but showing the working. Draw attention to the links with the grid method above.
- Again begin with the units by multiplying 8 and 7 and then writing the answer below the line.
- Then move onto multiplying the single digit by the tens. Encourage your child to say 'thirty multiplied by 7' rather than '3 multiplied by 7' but discuss the relationship between the two.
- Add the component parts to achieve the final answer.

$$\begin{array}{r} 38 \\ \times \quad 7 \\ \hline 56 \quad (8 \times 7) \\ 210 \quad (30 \times 7) \\ \hline 266 \end{array}$$

Short multiplication

- The recording is reduced further, with carry digits recorded below the line.
- Again complete the units first. 8 x 7 = 56 so put the 6 in the units column and carry the 5 tens.
- Multiply 7 by 30 which gives 210 and add the carried 5 tens which gives 260. Write this in the appropriate column.

$$\begin{array}{r} 38 \\ \times \quad 7 \\ \hline 266 \\ \hline 5 \end{array}$$

Two-digit by two-digit products

- Extend to a two-digit number multiplied by another two digit number, asking your child to estimate first.
- Start with the grid method using the same strategy as for a two-digit number multiplied by a single digit number.
- Multiply the parts of the calculation and then add the component parts to achieve the final answer.
- Again encourage your child to use the language of 50 multiplied by 20 to ensure they understand the value of each digit.
- This method can also be used for three-digit numbers multiplied by three-digit numbers.
- Some child find this method easier than the standard method of multiplication. This is perfectly acceptable as it is important for your child to be confident in the method they are using.

Estimation:

$60 \times 30 = 1800$

$56 \times 27 = 1512$

x	20	7	
50	1000	350	1350
6	120	42	162
			1512

Add across the rows, then complete a column addition.

Estimation is an important skill for checking calculations in real life

Standard written methods of long multiplication

- Multiply the units first and carry the tens e.g. 7 x 6 = 42 so put 2 in the ones column and carry the 4 tens. Then multiply the 7 by 50 which gives you 350. Add the 4 tens which gives you 390.
- Multiply the 20 by the 6 which gives 120. Carry the hundred and put the twenty in the tens column.
- Multiply 20 by 50 which gives 1000. Add the carried hundred.
- Now add the component parts in the column addition.

$$\begin{array}{r} 56 \\ \times\ 27 \\ \hline 392 \\ {\scriptstyle 4} \\ 1120 \\ \hline {\scriptstyle 1} \\ 1512 \\ \hline {\scriptstyle 1} \end{array}$$