



Develop children's fluency with basic number facts

Fluent computational skills are dependent on accurate and rapid recall of basic number bonds to 20 and times-tables facts. At Ashdene we spend a short time every day on these basic facts, which quickly leads to improved fluency. One way we do this is through daily counting. This is not meaningless rote learning; rather, this is an important step to developing conceptual understanding through identifying patterns and relationships between the tables (for example, that the products in the $6\times$ table are double the products in the $3\times$ table). We also learn our multiplication tables in the following order to provide opportunities to make connections:

$\times 10$	$\times 5$	$\times 2$	$\times 4$	$\times 8$	$\times 3$	$\times 6$	$\times 9$	$\times 7$
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Develop children's fluency in mental calculation

Efficiency in calculation requires having a variety of mental strategies. In particular, we recognise the importance of 10 and partitioning numbers to bridge through 10. For example: $9 + 6 = 9 + 1 + 5 = 10 + 5 = 15$. It is helpful to make a 10 as this makes the calculation easier.

Develop fluency in the use of formal written methods

Teaching column methods for calculation provides the opportunity to develop both procedural and conceptual fluency. At Ashdene we ensure that children understand the structure of the mathematics presented in the algorithms, with a particular emphasis on place value. We use concrete resources to support the development of fluency and understanding. Informal methods of recording calculations are an important stage to help children develop fluency with formal methods of recording. However, it is important that these are only used for a short period, to help children understand the internal logic of formal methods of recording calculations. These are the stepping stones to formal written methods.



Stages in Addition

1. Begin formal recordings in a number sentence:

$$3 + 2 = 5$$

2. Use of number lines

Addition

using a number line

$$25 + 36$$



3. Introduction to vertical layout, using partitioning

300	+ 70	+ 8	
400	+ 80	+ 7	
700	+ 150	+ 15	= 865

As an additional support method (If needed): Vertical layout, expanded working, units first.

$$\begin{array}{r} 368 \\ + 493 \\ \hline 11 \\ 150 \\ 700 \\ \hline 861 \end{array}$$

4. Vertical layout, contracting the working to a compact efficient form:

$$\begin{array}{r} 368 \\ + 493 \\ \hline 861 \\ \hline \end{array}$$

Note: The numbers 'carried' will be shown under the line.

Stages in Subtraction

1. Begin formal recordings in a number sentence:

$$6 - 1 = 5$$

As an additional support method, children will use a number line to count back.

2. Using a number line to count on:

$$83 - 27$$



$$50 + 3 + 3 = 56$$
$$\therefore 83 - 27 = 56$$

3. Expanded Decomposition:

$$563 - 241$$

$$\begin{array}{r} 500 \quad 60 \quad 3 \\ - 200 \quad 40 \quad 1 \\ \hline 300 \quad 20 \quad 2 = 322 \end{array}$$

4. Decomposition

$$\begin{array}{r} 5 \quad 6 \quad 3 \\ - 2 \quad 4 \quad 1 \\ \hline 3 \quad 2 \quad 2 \end{array}$$

and

$$\begin{array}{r} 45 \quad 156 \quad 13 \\ - 2 \quad 7 \quad 8 \\ \hline 2 \quad 8 \quad 5 \end{array}$$

Note: We are not 'borrowing'. We are exchanging. Eg. I am exchanging one ten for ten ones.



Stages in Multiplication

1. Begin formal recording:

$$5 \times 2 = 10$$

2. Use of arrays:

$$3 \times 6 \text{ or } 6 \times 3 =$$



3. Grid method:

$$38 \times 7$$

x	30	8	
7	210	56	266

and

x	50	6	
20	1000	120	1120
7	350	42	392
			1512

As an additional support method (If needed): Vertical format, expanded working

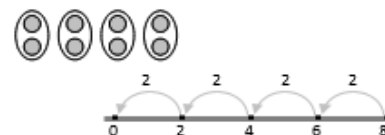
$$\begin{array}{r} 38 \\ \times 7 \\ \hline 56 \quad (8 \times 7) \\ 210 \quad (30 \times 7) \\ \hline 266 \end{array}$$

4. Vertical format, compact working

$$\begin{array}{r} 38 \\ \times 27 \\ \hline 266 \\ 760 \\ \hline 1026 \end{array}$$

Stages in Division

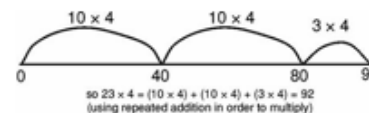
1. Number lines & grouping:



2. Arrays:



3. Chunking using a number line:



4. Chunking:

$$\begin{array}{r} 48 \div 4 = 12 \\ - 40 \quad (10 \times 4) \\ 8 \\ - 8 \quad (2 \times 4) \\ 0 \end{array}$$

And

$$\begin{array}{r} 97 \div 4 = 24 \text{ r } 1 \\ - 80 \quad (20 \times 4) \\ 17 \\ - 16 \quad (4 \times 4) \\ 1 \end{array}$$

5. Short division:

$$\begin{array}{r} 0 \ 3 \ 5 \\ 5 \overline{) 175} \end{array}$$