percentages : the build-up method

The *build-up method* is a simple way of working out percentages, something which many people find difficult. To illustrate the method, let's take some examples :

example 1 : find 15% of 80

We probably can't do this straight away in our heads. However, one thing we do know immediately is 10% of 80 (after all, that's just one tenth of 80) :

$$10\% \text{ of } 80 = 8$$

But if we know 10%, we can say straight away what 5% is (since it's just half of 10%) :

$$5\% \text{ of } 80 = 4$$

Now we know what 10% of 80 and 5% of 80 both are, we can just add them together to get 15%. And that's it! We can set our calculation out like this :

$$
\begin{array}{lll}
\textit{15\%} & \textit{of} & \textit{80} \\
\hline
10\% & \dots\dots & 8 \\
5\% & \dots\dots & 4 \\
\hline
15\% & \dots\dots & 12 \\
\end{array}
$$

Now let's try something a bit harder :

example 2 : find 35% of 64

With our basic starting-point that 10% of 64 is 6.4
we can begin. (This time as well as relying on 5%
being half of 10%, we'll also need to rely on the fact
that 20% is double 10%).

$$35\% \quad of \quad 64$$

10%	……	6.4
20%	……	12.8
5%	……	3.2
35%	……	22.4

example 3 : find 22% of £4.50

First of all we know that 10% of £4.50 is 45p; so
20% must be 90p. And of course, if we know 20%
then we know 2% (it's just one tenth of 20%) :

$$22\% \quad of \quad £4.50$$

20%	……	90p
2%	……	9p
22%	……	99p

example 4 : find 90% of 120

Here we start as usual with 10% but this time we
take it away from the original number (since of

course 100% – 10% = 90%). Here's the whole calculation :

$$
\begin{array}{ccc}
90\% & of & 120 \\
\hline
100\% & \ldots\ldots & 120 \\
10\% & \ldots\ldots & 12 \\
\hline
90\% & \ldots\ldots & 108
\end{array}
$$

Of course, we don't have to start every calculation with 10%. Pupils should know that 50% means the same as one half and sometimes this gives the best starting point :

example 5 : find 45% of 60

Straight away we know that 50% of 60 is 30. This means that 5% of 60 must be 3 (5% is one tenth of 50%). Here's the calculation for 45% :

$$
\begin{array}{ccc}
45\% & of & 60 \\
\hline
50\% & \ldots\ldots & 30 \\
5\% & \ldots\ldots & 3 \\
\hline
45\% & \ldots\ldots & 27
\end{array}
$$

VAT used to be 17½% (now it's gone up to 20%). Working out 17½% of something looks as if it might be a bit tricky but in fact it's surprisingly easy. You

just need to notice that as ever 10% is easy to work out, that 5% is half of that – and that 2½% is just half of 5%. Here's an example :

example 6 : find 17½% of £48

17½% of £48		
10%	……	4.80
5%	……	2.40
2½%	……	1.20
17½%	……	8.40

* With a little practice, the build-up method can be used for any of the straightforward percentages which you can reasonably ask pupils of this age to work out. For more difficult percentages we suggest the calculator (for you and them).

percentages work both ways : a special note

Here's something really useful – but which very few people seem to know :

32% of 25 is just the same as 25% of 32

If you're not sure whether to believe this, just check it out. Use your calculator or any method you like. And try a few different examples until you're really sure that percentages really do work both ways . . .

Why is this useful? Well, suppose you were asked to work out 32% of 25. You'd immediately think, *'That's going to be awkward to work out!'* or perhaps, '*I think I need a calculator for this one!*' But suppose you just turn the thing round and look at 25% of 32 instead . . .

25% of 32 is just a quarter of 32, isn't it? And that's easy to work out. In fact, you can do it in your head. No problem!

32% of 25 = 25% of 32 = 1/4 of 32 = 8

A few examples for you to try: 11% of 50, 9% of 50, 24% of 25, 80% of 25, 48% of 25, 16% of 75 . . .