

See how they run: NUMBERS ON a graphical calculator

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My only problem when attending the ATM Easter Conference is choosing which of many potentially interesting sessions to attend. This year, despite the early hour of 9am, I could be found clutching a SHARP EL-9400 graphical calculator eagerly awaiting an hour and a half on 'Using a large screen calculator to help develop number awareness and mental skills', focusing on upper primary and lower secondary pupils.

Here let me confess. All my teaching experience has been in comprehensive schools. I have never taught in a primary school and never used a graphical calculator for anything other than graphical investigation and consolidation. Although I had sometimes wondered what potential there was for developing number awareness, there seemed never the time, nor energy, to pursue such thoughts. Whilst many of my students bought their own machines and taught themselves and others with remarkable ease, I resorted to my trusty scientific calculator for everyday calculations and my own graphical calculator remained in its case in pristine condition. The departmental set of 15 graphical calculators remained largely unused. Now at last was a chance to hear from the experts (Graham Galtrey and Christine Hemon, Educational Advisors from Sharp Electronics). How, despite an increasingly hostile press regarding calculator usage, would

they recommend we could use modern technology to enhance fluency with number?

The workshop started with an introduction to using the basic arithmetic functions of the Sharp EL-9400. It all seemed much more user-friendly than my rather elderly graphical calculator - or is that just because someone was on hand to explain what to do? Graham valiantly talked us through increasingly complex aspects of the calculator; not an easy task as twenty or so adults proceeded to investigate different functions and hit different snags all of which required immediate attention - just like a maths classroom really! Christine sprinted around trouble shooting, whilst we 'played'.

One immediate advantage of using a large screen calculator is that question and answer can be seen at the same time. For example:

$296 + 597$	893
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This should encourage mental approximation – seeing that the answer ‘looks right’ is easier if the question is also visible. Pattern recognition and understanding of structure should also be enhanced. For example: predicting the answer to 12×13 whilst seeing the result of both 3×13 and 6×13 , as in the figure below.

$3 * 13$	39
$6 * 13$	78
$12 * 13$	

This not only enables pupils to explore number relationships but also empowers them with mental strategies to answer more complex questions such as 24×13 or 48×13 . And what about 48×26 ?

To me, this seems to be the power of all calculators – that our pupils can explore the nature of number in a ‘safe’ non-threatening environment. The calculator becomes a teaching and learning tool, not just a mechanical device for rote calculation. The advantage of the graphical calculator is that it also acts as a recording device.

A further advantage of the SHARP EL-9400 is that fractions can be displayed so that they really look like fractions, i.e. $\frac{1}{3}$ rather than $2 \div 3$. How refreshing! (This facility is available via a special menu.) Another aspect I particularly liked was the ability to generate sequences, as shown in the next figure.

Ans + 12	12
	24
	36
	48

The teaching potential here is great. Pupils frequently think of an infinite sequence as finite (the n th term is 120) – with this calculator more and more terms can be added with very little effort. Yes I know ‘basic’ calculators can often act iteratively but do pupils understand what they are doing? (And yes, I know spreadsheets are wonderful for generating sequences but how often can you access the computer when you really need it?)

In an hour and a half there was too little time to explore more than the basics. I did not see the calculator handbook so cannot comment on whether it is user friendly. However, the notes and ideas provided by Graham and Christine were clear, if uninspired. A word of caution – the calculator has several menus that allow the user to set, for example, all calculations to integer values. The previous user to me had done just that – and unfortunately I started by exploring decimals. I soon ‘learnt’ that a decimal squared is always an integer! Moral – check the set up menus before use.

Interestingly, during the whole session I spoke to no-one other than the instructors, and no-one spoke to me. Throughout my teaching experience, I have always found classroom discussion to be the key to the development of understanding and here was I happily isolated. Perhaps more engaging activities would have broken my isolation – perhaps not. Certainly I am now more sensitive to the needs of some pupils, at times, to reflect quietly.

At present the only relevant resource produced by SHARP is an excellent newsletter, ‘On the button’ – a Primary school update. This contains interesting and clear descriptions of lessons, which made me want to know more. What a shame there seems to be no clear, concise and well presented activities for use in primary and lower secondary school classrooms. Are there other people out there who might be interested in developing activities based on number work? If so, perhaps we could work together? Interested? Please phone 01753 747204 (day-time), 01635 200807 (evenings).

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