THOSE B___Y TIMES TABLES

> **It is not knowledge, but the act of learning, not possession but the act of getting there, which grants the greatest enjoyment.** Leonhard Euler 1808

"How do you expect me to teach, them when they don't even know their tables."

Unfortunately being able to memorise multiplication tables is like a train ticket; it entitles you to proceed. Without it mathematical process is deemed impossible despite a number of great mathematicians who were never able to commit tables to their memory.

Many may think I am against the rote learning of tables. This was never true, it works for many but not for all and for those who can't it can stop their mathematical development and even cause a fear of mathematics. To those for whom the rote learning of tables is like flogging a dead horse I would add those stuck having to recite the whole or part of a table to get the answer they require.

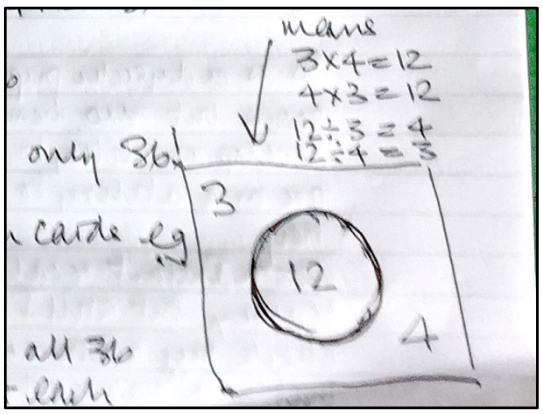
So in-spite of what their teachers try, a significant number of students will leave school without table mastery and of those many will have negative feelings about mathematics and a lasting sense of failure.

In my first year of teaching I was given a bottom set of 3rd years (now Y9) to teach and told to teach them their tables so I set myself the task of getting them all to full table mastery.

During the first lesson I wrote up, with their help, the multiplication tables from '2 times' to '9 times' on the board. I tried to point out patterns including 'the great 9 times' and explain why we did not need '1 times' and '10 times'. I demonstrated that each table fact appeared twice and we drew diagrams to illustrate that, for example 4 x 8 is commensurate with 8 x 4.

Next lesson we all wrote up the table as I had done during lesson before and they took it in turns to cross out doubles. We got down to 36 number facts. We ended the lesson with a base line test of all 36 facts.

Back home my primary teaching wife introduced me to 'flash cards' which she used as part of her English lessons. I set about making 36 flash cards on bits of A5 card, each to represent one the 36 number bonds: 2 x 2 to 9 x 9. So for example for 4 x 8 or 8 x 4 , 32 was written inside a circle with 4 and 8 placed outside, similar to the 3 x 4 example here from my notebook.



I started each lesson by introducing a couple of cards at random and explaining not only did 4 x 8 = 32 and 8 x 4 = 32 but 32 ÷ 8 = 4 and 32 ÷ 4 = 8 and that 32, 4 and 8 are bonded together.
I carried on with this until I could hold up any card and the class would call out the four number facts the card represented.

Over half term I wrote up a set of tests. Each test consisted of 36 questions, one for each number bond, but in random order and each presented in one of the four ways. I reproduced the test on slips of paper. We were then ready to go.

Back after half term we had a warm up using 5 or 6 cards and then the first test was given out and I told them to put their hand up when they had finished. On completion each pupil was given their time so, after marking the test each had a score and a time.

The rest of the lesson was spent showing the group how to prepare two graphs, one to record their scores and one for the times taken.

I mounted the graphs on the notice board and started the next lesson with the second test. Each pupil recorded their results on their graphs. The process was repeated for the rest of the term by which time all had reach 100 percent and all had reduced times.

With all of us pleased we went off for Christmas.

During spring term the group and I did some maths together, the graphs remaining on the wall.

Back at the beginning of the summer term I sprang the original test on them.To my surprise and disappointment the group's scores remained much as they were at the very beginning. So I began to repeat the process.

Scores reach 100 percent the second time as did the time taken but although I could get table mastery in the short term I was unable to get consistent retention.

This experience did however improve my knowledge of 'multiplication tables', something that I had been unable to do during my own schooling.

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