Section

Being fluent with numbers makes all kinds of tasks easier

Why do numbers matter?

A

10 SEC summary

Everyone needs numbers because numerical descriptions of the world – data – are vital for everyday life.

Numbers are vital

We need numbers to express the relative size or scale of different phenomena. This makes them essential for social science, or for any course of study. We would struggle to describe many aspects of society without using numbers. Statements like 'most people work' or 'there are few women CEOs' are often not precise enough to capture the relationships or processes we're interested in explaining. Thus, we need numbers.

Most of the numbers we need to use and management of them require only basic arithmetic. However, unless you're sufficiently fluent in this management, your attention will be diverted onto this instead of staying with the story we're using the numbers to tell.

Unfortunately our brains aren't well adapted for numbers. That's why they require some concentration in a way that, for example, the rules of language – which are every bit as complex – do not. Some practice is essential.

WHY WE NEED NUMBERS

The data revolution has made data central to almost every university subject and every professional career. Being fluent in handling numbers is a basic skill that proves enormously useful for dealing with data and all kinds of numerical evidence, not only at work but also in everyday life.

Most of the maths you need is basic arithmetic, but it's easy to become rusty if you don't keep using these skills. If you last studied maths at school a few years ago you'll find a refresher helpful. Otherwise, the focus of your attention on what it is you're studying gets diverted onto sorting out how to handle the maths. Instead of being a vehicle for learning, the numbers can become an obstacle.

HOW TO GET YOUR HEAD AROUND NUMBERS

The good news is that there are many online and offline resources to help you understand numbers. Even better news is that the calculator on your phone or a spreadsheet package on a computer will instantly perform any calculation you'll ever need. The bad news is that no calculator in the world will tell you *which* calculation it is that you need to make. To understand that you need some basic rules and *there's no substitute for practice* in learning them: it's the only way to make the 'rules' second nature so that you don't have to waste time thinking about them.

WHY NUMBERS NEED CONCENTRATION

We use numbers to express quantity and report measurements: to grasp the scale of something. In everyday life on the savannahs a hundred thousand years ago the range of scale humans evolved to deal with was small. Thus we have a good intuitive feel for simple numbers and quantities like 'a little', 'a lot', 'some', and, perhaps using our fingers, we can manipulate numbers up to 10 without much thought.

MATHS BUILT
THE PYRAMIDS

Mathematics was the first form of logically rigorous thought to be developed as settled agriculture made civilization possible. In the time of the Pharaohs maths was used to work out the area of arable land or the amount of tax revenues. However, the scale and complexity of modern society, or the measurements produced by scientific research, demand numbers that are at once more precise and range from the unimaginably small to the gigantic. Maths is used to hunt for the Higgs boson particle or estimate the size of the Galaxy.

WHY CONCENTRATION TAKES EFFORT

Our brains have not evolved to be particularly good at maths. That's why dealing with numbers takes effort and a clear head. The beauty of simple maths is that it is pure logic – all the rules fit together perfectly. They are also cumulative – each rule builds on others. A good foundation in the elementary rules set out here makes any maths or calculations you encounter very much easier, by making much of the logic 'second nature' and freeing up your working memory to deal with the problem at hand instead of thinking about how the tools you're using to deal with it work.

DON'T KEEP EVERYTHING IN YOUR HEAD

This means two things. First, pen and paper are essential. Writing things down saves trying to remember everything which can get jumbled up or forgotten. Second, practice is even more essential. You can read all about how to ride a bike and yet still fall off when you try it. Only practice makes balancing and steering, starting and stopping 'second nature' rather than something you have to concentrate on. The time invested in practising the basics described here will pay enormous dividends and save large amounts of time later.

THE REWARDS OF NUMBERS

People who are competent with numbers also enjoy a better life. Numbers can be good for your wallet, since these people are in relatively short supply and command good salaries. As one of them you could almost pick the kind of career or job that you genuinely want. It also makes you a much more critical consumer of numbers in everyday life, whether working out the true value of supermarket offers or the quality of 'evidence' offered in newspapers or by politicians.
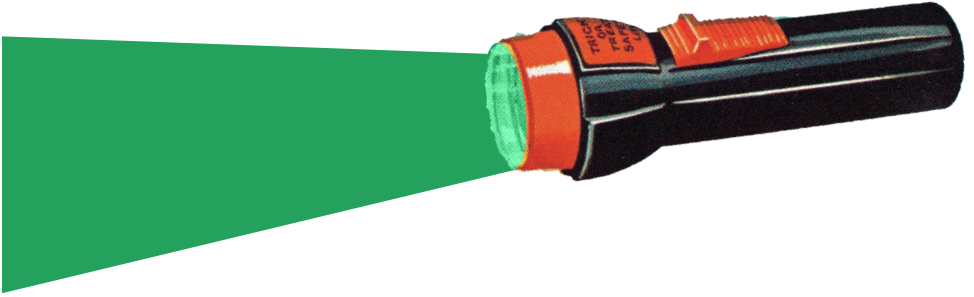
The data revolution also means that numbers are becoming steadily more important in almost every area of life. This does not require you to become a mathematical genius. You just need to be able to count and, just as important, to spot where numbers can be used effectively, or when they're being used well to illuminate, or badly to prop up, a poor argument. Most problems and challenges resolve into applying simple maths to complex situations, not complex maths to simple situations (which, unfortunately, tends to be the focus of most school maths).

I assume that you can add, subtract and multiply whole numbers? Let's make sure! Here's a quick quiz. Try it without a calculator if you can. If you get these questions right, you're good to go.

1   What is **136 + 59 + 11**?

2   From the list of numbers **7, 25, 32, 49, 55, 69, 80,** write down two numbers with a sum of **57**

3   A country has 25 million workers in its active workforce and 17 million people in its non-working population. What is the total population of this country?

4   What is **123,000 – 36**?

5   In one year, there was a total of **134,000** immigrants to a country, while 86,000 people left. What is the net migration into this country for that year?

6 What is **12 × 13**?

7 In the list of numbers **25, 32, 49, 55, 69, 86, 96**, circle all the multiples of 8

8 A researcher has **£2000** to pay respondents for a survey. If **125** people sign up for the survey, how much can the researcher pay each respondent?

9 A school board has **5** representatives per district council and there are 23 districts in the county. How many representatives are in the county?
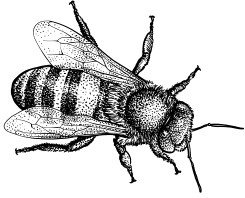
You should've got all those right. If you need a quick refresher on the basics, there are online maths resources to suit all tastes. The following sites are worth trying if you need to check something:

www.mathsisfun.com

A US site covering years 1 through 12 of the school curriculum there.

www.mathtutor.ac.uk/

My favourite – very thorough but quite slow. There are both video and text versions of each topic.

www.khanacademy.org/math

Some people find Sal Khan's videos irritating, I find their obvious enthusiasm infectious.

Don't skip the exercises.
Practice does make perfect.

A fraction is the building block of a comparison