

Even if you're an aeronautical engineer who uses Excel to decide which SmartPhone to buy, there will inevitably be some bits of maths that you'll never need. So isn't it just one big waste of time?

### 3. The value of learning something even if you will never need it again, ever

- **Learning to learn** – how to develop an understanding of something new, and how to train yourself to remember the important bits. The world is changing faster than ever, and your teachers are in the tricky situation of having to prepare you for jobs and careers that don't even exist yet. We can't possibly teach you all you'll ever need to know, so hopefully – along with some stuff that might come in handy – we're teaching you to learn. Even if you never need to simplify surds again (and, let's face it, why would you?) the fact that you are learning how is training your brain to deal with new information, synthesise links, identify patterns and interpret rules. These skills are not only useful, they are essential in everyday life.

- **Logic** – mathematics requires a certain level of rigour, a necessity for rational and critical thinking which is invaluable in so many areas of life.

The sometimes frustrating black-and-white right-or-wrong aspect of maths is integral to the nature of the subject. It also means that the more you study maths the more rigorous you naturally become in other areas of your life. You will start to critically examine statements, to identify flaws in reasoning and to make sure that when you apply yourself to a task it is carried out thoroughly and reliably. Say what you like about maths, it's not a wishy-washy subject.

- **Problem Solving** – many mathematicians enjoy solving problems just for the sake of it. But even if you don't, there are always plenty of problems that need solving.

Maths doesn't make us experts at solving every problem, but it should equip us with some tools which may be beneficial in looking for a solution. Interpreting and formulating problems, clarifying the requirements and parameters, and verifying solutions are all key aspects of mathematical problem solving, but also of any form of problem solving. Solving puzzles, logical riddles and mathematical conundrums, as well as playing games (both strategy and chance) help to hone these skills which we use every single day.

## Maths: What's the point?

*Why bother learning mathematics?*



IT'S WEIRD HOW PROUD PEOPLE ARE OF NOT LEARNING MATH WHEN THE SAME ARGUMENTS APPLY TO LEARNING TO PLAY MUSIC, COOK, OR SPEAK A FOREIGN LANGUAGE.

*"The only things you HAVE to know are how to make enough of a living to stay alive and how to get your taxes done. All the fun parts of life are optional."*

Randall Monroe (xkcd.com)

This leaflet is designed to help you understand three things:

1. Why maths is a big deal.
2. How maths might be useful to you.
3. The value of learning something even if you will never need it again, ever.

## 1. Why maths is a big deal

Throughout history, mathematics has been one of the key defining features of an advanced civilisation. It was developed, in a variety of different – and yet recognisably similar – forms, all across the ancient world. Wherever a builder gave a quote, whenever a trader needed an edge over his competitors, every time a military tactician planned a campaign, maths was the difference between making a profit and losing your livelihood, between victory and defeat.

These days, technological advances mean that we need maths, if anything, more than ever before. It is an absolutely fundamental element of computer science, electronics, engineering and science. As our life expectancy increases, we depend more and more on medical advances which, in turn, are quite simply impossible without mathematics. As the economy weeds out every business that can't move with the times, only those who can perform proper analyses and make informed business decisions can survive. In a country where farmers used to make a living off a dozen head of cattle we now have dairies that run to thousands of beasts and farmers constantly chase economies of scale and models of efficiency that can only be done with a proper understanding and application of maths.

*OK, so hopefully you're convinced that maths has a part to play in the world. But that doesn't mean you'll ever find a use for it, does it?*

## 2. How maths might be useful to you.

First let's recognise that *the majority of people will pursue maths well beyond compulsory education.* More than half of all people studying at university this year are following courses with a large maths element – Science, Medicine, Architecture, Engineering, Finance, Business, Economics, Computing, Graphic Design, Sociology, Statistics, Logistics, to name a handful. This list doesn't even take into account all the people who plan to run their own hairdressing salon, train to become a supermarket manager, learn a construction trade, become a pilot, etc.

If you intend on following the crowd and end up in a job like those on the list, you will see some of the huge applications of topics that currently appear totally mysterious. You might see how engineers use circle theorems and compass construction when building a cam, or how quadratic equations make your Sky dish work. Maybe you'll find a use for bearings on board ship, or applications of trigonometry in forestry & conservation. But if you're reading this, maybe you're not planning on becoming a vet or a computer game designer. What if your job doesn't require any maths whatsoever? Here's a few key bits of maths that almost everyone will use at some point in their lives:

- **Money** – a lot or a little, managing your finances well can be the difference between contentment and misery.

If you've ever tried shopping in a foreign market where you don't know the language, you have some idea of what it's like to try to make it in the 'real world' without a good understanding of basic financial mathematics. From choosing car insurance to putting a deposit on a house, and from grocery shopping to booking a holiday, a little maths can save you literally thousands.

- **Statistics** – drawing the correct conclusions, or making sure other people have.

Do you know how to interpret information? Can you use your analysis to inform decisions? Wouldn't it be handy every now and then to be able to convince someone that you were right by producing compelling evidence? When a company or politician throws statistics at you, will you just take them at face value, or be able to interpret them with a bit of inside information?

- **Computing** – in a world where everything is done by computer, wouldn't it be handy to understand them?

You may not think of your IT knowledge as maths, but there is more overlap than the school curriculum might make you think. Can you use a spreadsheet to make a budget? Do you have the analytical skills necessary to find and verify information you need from the internet? Will your problem solving skills come in handy the next time something goes wrong?

PS – don't even get me started on percentages. They are practically a part of the English language, so if you plan to go through life without even a basic understanding of them, you might as well hope you'll never need to use words longer than 3 syllables...