

# **ENGINEERING**

42% of the engineering workforce in the UK is over the age of 45. This means there will be a huge demand for young engineers in the decades to come!

## CAREER PATHS

- · Chemical Engineer
- · Civil Engineer
- Mechanical Engineer

# IT & THE INTERNET

People with qualifications in Information Technology have one of the highest rates of employment in the UK.

## CAREER PATHS

- · Games Developer
- · Software Programmer
- Network Engineer
- · Web Designer

# **ACCOUNTANCY**

The number of accountancy associations in the UK has grown by 3.7% since 2006. Student numbers have been growing even more quickly!

## **CAREER PATHS**

- Tax Accountant
- Auditor
- · Forensic Accountant

# WHERE CAN MATHS TAKE YOU?

# **SCIENCE & RESEARCH**

It's predicted that in the next few years, 1 in 4 jobs will have been created by science and research - leading to 140,000 new science jobs by the end of 2018.

## CAREER PATHS

- Research Scientist
- Mathematician
- · Statistician

# **BANKING & FINANCE**

51% of employers in the banking and finance industry believe there is a skills shortage amongst their employees.

### CAREER PATHS

- · Retail Banker
- · Financial Advisor
- · Fund Manager
- Stockbroker

# 10

# CONSULTANCY

In the future, consultants with skills and knowledge in digital technology, financial services, retail and infrastructure will be in high demand.

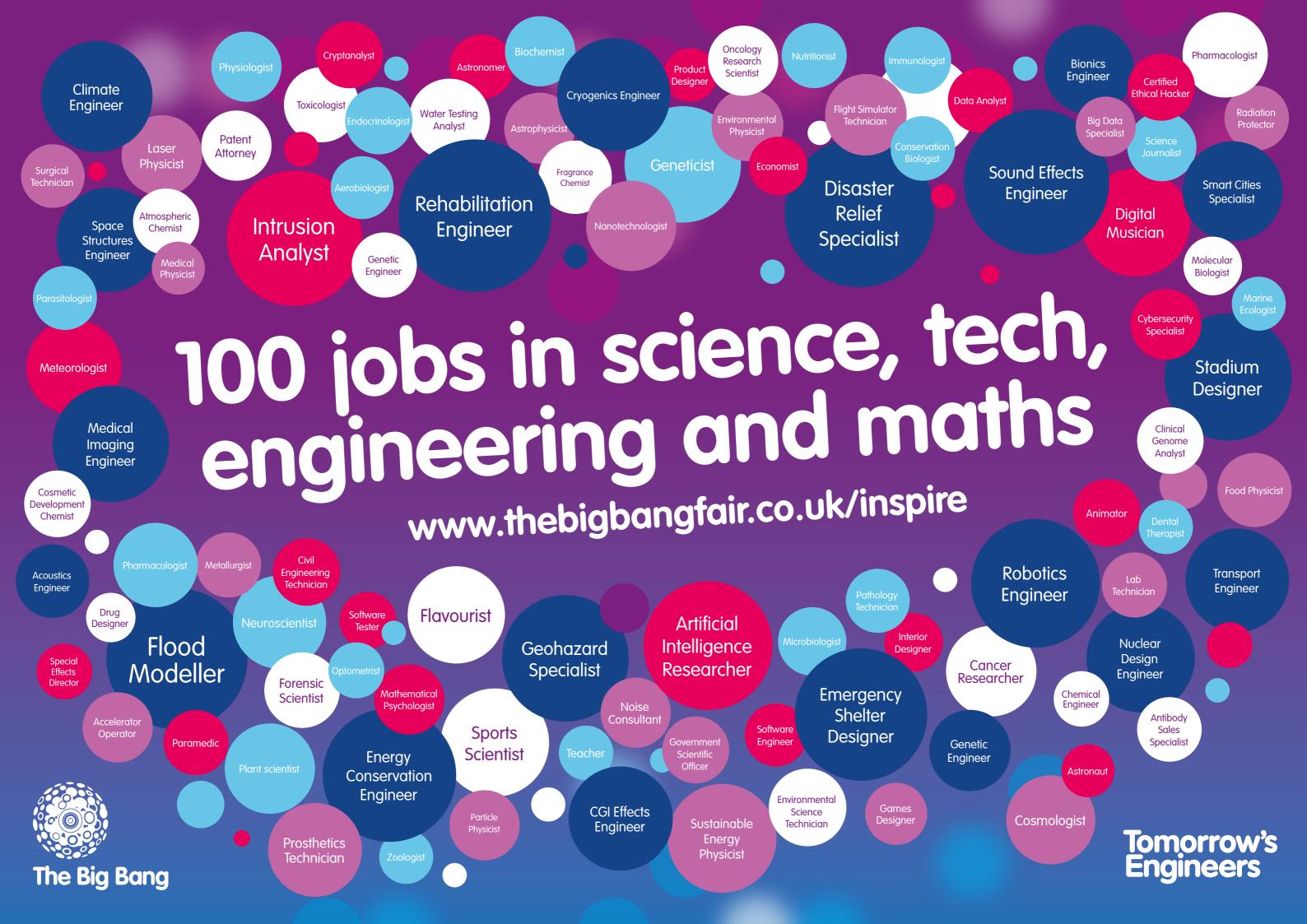
## CAREER PATHS

- Management Consultant
- · Data Analyst
- IT Consultant

Want to learn more? Click on a box to find out more about each career zone and how you can get there.







# **100 JOBS IN STEM POSTER**

This display poster can prompt classroom discussions and help students understand some of the exciting jobs that await, if they continue studying maths, sciences, D&T, computing and other useful subjects.

Students might like to think about the following:

- The job(s) they like the sound of most
- The job(s) they think may not have existed 10 years ago
- Different jobs that might exist in 10 years' time

Students can find definitions of the jobs at: www.thebigbangfair.co.uk/inspire

# **THEMED POSTCARDS**

If you have ordered the full resource pack, you will find a set of themed postcards inside, each containing a discussion point for students.

Students can use this poster to inform and inspire these discussions, and they might like to connect the jobs on here with the challenges that engineers are working on.

To download or order printed copies of the postcards, leaflets, posters and other resources, go to:

www.tomorrowsengineers.org.uk

Students can also have a look at the engineering case studies to find out more about what people working in engineering do.

We would love to hear about how you and your students have used the poster, postcards and any of the other resources:

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# NOVATIVE

Get the skills to succeed in tomorrow's careers

he 21st century has been described as the century of ideas, and has included technological changes that are the biggest, most disruptive and fastest moving shifts that humankind has experienced. Considering what subjects to study and the careers that may follow can be exciting and daunting. On the one hand, this is a world of endless possibilities, yet on the other hand, so many options can be confusing.

Regardless of the path you choose, some skills are universal and lifelong. Maths provides essential problem-solving skills that each of us can use every day. In my own career, I find myself continually circling back to data and numbers, and not only in terms of dollars and cents. Data and numbers empower me to make smarter decisions. They allow me to make sense of what our customers want and need. They help keep me informed so I can be a better leader. I studied maths in high school and continued throughout university. I must admit it was challenging at times! But looking back, including maths in my studies was a good decision, one that has helped me in all of the varied roles in my career.

At Commonwealth Bank, we believe in the future of young Australians. We have a strong legacy of creating and running programs and initiatives that support your financial wellbeing; from our in-school award-winning Start Smart program to the School Banking savings program with Dollarmites, and our hub for parents and students, The Beanstalk.

We also believe maths is an enabler of endless opportunities. It is a crucial part of a prosperous and successful Australia. I hope you enjoy exploring these opportunities and find inspiration in the following pages.

## Vittoria Shortt

Group Executive, Group Marketing and Strategy Commonwealth Bank of Australia







hen Monica Wulff came home from Sydney's German International School the only homework her Englishspeaking parents could understand was maths. "There's a universal language with maths which transcends our regular verbal languages, which I think is a uniting factor," says Monica.

Often described as the "language of science", people naturally good at maths are better at picking up foreign languages, but the similarities don't stop there. Contrary to popular belief – and much like languages – you don't have to be a genius to use and benefit from maths.

"We've gotten caught up with the idea that doing maths means you have to be really good at it," Monica says. "But doing maths is like doing anything else – you'll have varying levels of competence and that's OK. Understanding how some of it works allows you to see everything in a different light."

Monica's maths teacher told her she wasn't the best at maths, but that she was good at statistics. So after a double degree in applied finance and economics from Macquarie University in Sydney, she joined the Australian Bureau of Statistics where she noticed a gap in knowledge – there were no statistics on the startup community. As a result, Monica founded Startup Muster in 2013 to offer "relevant, reliable statistics that showcase what is going on in this community".

Her experience is becoming more common as people begin to realise that instead of being a dry, irrelevant classroom topic, maths is critical to modern careers. Moreover, it gives you an understanding of the world and a set of tools that allow you to fully explore your passions and interests. – Ben Skuse

# FORENSIC SCIENTIST Just like the stars of TV's CSI, forensic scientists solve crime by analysing DNA samples, blood spatter patterns and much more. HOW MATHERS OF THE STANDARD STANDA

Just like the stars of TV's CSI, forensic scientists solve crimes



IOW MATHS IS USED

Geometry and trigonometry is vital for blood pattern analysis; statistics and probability come to the fore when matching DNA patterns.

HOW WOULD YOU CHANGE THE WAY MATHS IS TAUGHT? "I would want to see how we could physically use the theory of maths in real life." - KAYLA GELMAN. MORIAH COLLEGE. QUEENS PARK. NSW

From protecting military and financial data to chasing digital crooks, cryptographers write algorithms to mask information and unmask cyberterrorists.

HOW MATHS IS USED

Modular arithmetic helps create "digital padlocks" and keys; algebraic geometry is the basis of "elliptic curve" cryptography; abstract algebra protects classified information.

**WATCH CAREERS** IN ACTION

CareerswithSTEM.com/ videns

FOREIGN EXCHANGE TRADER In seconds, you can decide how millions of dollars are spent. Foreign currency traders buy, sell and invest in currencies and use maths to quickly spot inefficiencies in the markets.

HOW MATHS IS USED

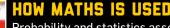
Statistics and probability help traders spot market gaps. Algebra, trigonometry and calculus let traders work out risk.

Nurses are at the frontline of health care in hospitals, clinics and in the community.

HOW MATHS IS USED

Percentages, fractions, calculations and ratios are part of the daily work of nurses, who are constantly monitoring drug dosages based on factors such as a patient's weight.

■ METEOROLOGIST Accurate and timely weather forecasts are critically important for emergency services delivery; preparation for extreme events; and safe aviation.

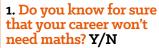


Probability and statistics assess weather; trigonometry helps predict location and movement.

Careers with Maths

# YOU DO THE MATHS

SHOULD YOU DROP MATHS IN YEAR 10? ASK YOURSELF THESE QUESTIONS FIRST



Studying maths seriously prepares you for any career. It's great for developing excellent problem-solving skills and thinking critically. You'll be amazed to find out how mathematically trained people use what they know in almost every field you could possibly think of.

## 2. Have you got the basic maths skills you need? Y/N

Whether you want to finish maths in high school or take it all the way to a PhD, you need to build the basics first. Maths at school is taught in sequences to help it all make sense; if you skip any of the groundwork you may be in trouble later.

But don't stress if you didn't do highlevel maths at school and still want to go to uni. Most universities offer bridging courses to help you get to HSC-level maths to be able to continue your studies.

## 3. Want to work for a cool coding company one day? Y/N

Many of the fastest-growing careers – particularly in technology – value maths skills. "Data literacy is more important than ever: just knowing Excel doesn't do it anymore," says UNSW Sydney statistics fellow Peter Straka, who recommends budding mathematicians also get to know some code programs such as Python or R. You can also try a free online resource like Khan Academy, Math Planet and Math Warehouse to up your maths skills.

## ... NOW KEEP READING TO SEE HOW THESE MAD MATHS SKILLS GET PUT TO USE



## COOKING

MasterChef fans everywhere know how important it is to get a recipe right. "I use maths all day, every day," says Ashlie Manganaro, an apprentice chef at Bluetrain restaurant in Melbourne. In her job she measures portions, calculates meal costs and converts measurements.



## START A BUSINESS

Matt Bullock, head of Spinify, is one successful guy. He completed a Bachelor of Computer Science (majoring in mathematics) at the University of Wollongong before starting online payment gateway eWAY and Spinify. This platform – based on 'game theory' – utilises high-level maths, statistics and probability to motivate sales staff.



# **BUILD GAMES**

Kevin Chan is the technical director of games studio, Robot Circus. He went into game development after getting his software engineering degree at the University of Melbourne. Software engineers use maths skills to reason with abstract objects and structures.



Royal Australian Air Force fighter test pilot Peter Tippner flies high in the sky. His Bachelor of Science (double major in science and maths) gets a workout when he uses geometry and trigonometry to assess flight courses, while direction compasses help Peter calculate angles and avoid hazards.



# 5. BE A HUMAN **RIGHTS CHAMP**

Field statistician Romesh Silva did a Bachelor of Science and German Studies double degree, majoring in maths, at UNSW Sydney before turning his expertise to human rights issues. Romesh now uses technology and statistics at the Human Rights Data Analysis Group in San Francisco to quantify human rights abuses. - Fran Molloy



rom putting a person on the Moon to analysing climate change to producing smartphone technology, maths is behind the biggest discoveries and inventions of our time.

"Maths is everywhere. It gives us tools to solve problems, helps us understand the world around us and lets us build cool stuff," says Dr Lewis Mitchell, lecturer of applied mathematics at The University of Adelaide.

"Maths can be applied to most challenges, even the ones we face when relaxing. In simple games like Candy Crush or Angry Birds, we recognise patterns or combine different tools to figure out a sequence of moves," he says. "We apply logical thought to solving problems – and often don't even realise we're using maths."

From engineering to business, marketing, public health or games development, a wide range of rewarding and well-paid careers require maths skills, so ensuring your maths foundation is solid in areas like algebra and calculus, for example, is key to getting a job.

"Employers are crying out for people who can use the power of mathematics to provide solutions and insights," says Lewis. "Maths teaches you to think, and that's valuable no matter what you do beyond high school." – Rachael Oku

# ACCEPTANCE OF THE PROPERTY OF

You learn to solve problems and do a thorough investigation

Computer programmer

Moths trains you to work in the abstract, to **think** creatively and come up with concrete solutions

Mathematicians are trained to absorb, condense and logically present vast amounts of information

It's important to be able to form and communicate opinions – to be able to weigh up the evidence

Millennium Mathematics Project



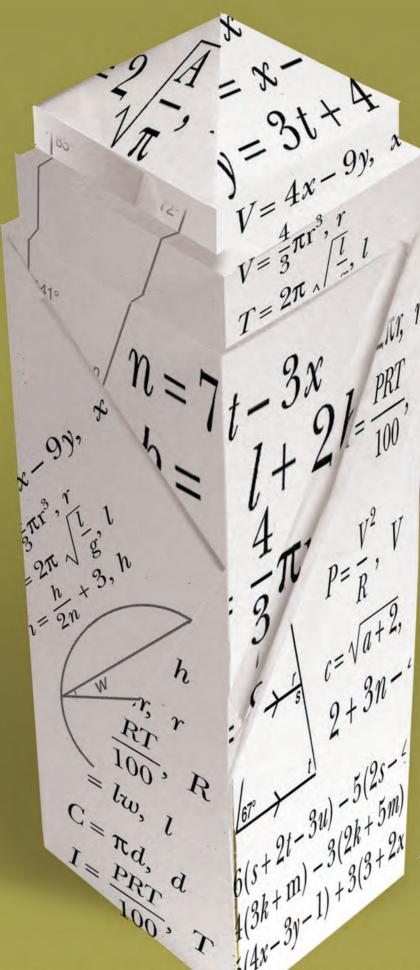
© University of Cambridge, 2004

that you can use in any

I've learnt to look at a problem from every angle and identify the core idea

Maths and stats teach you to handle and

Find out more in the 'Careers with maths' Library, from Plus, the free online maths magazine



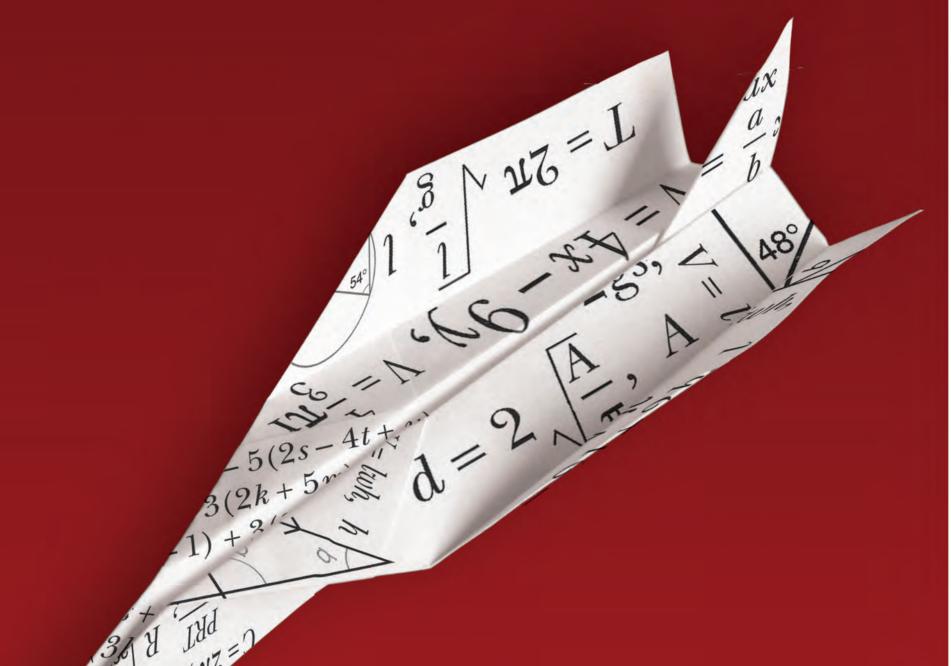
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# SEE THE MATHS IN ARCHITECTURE



From the spectacular pyramids of ancient Egypt to the modern day marvels we see around us – the designs we are impressed by use an impressive amount of maths, from shapes and space using computer modelling and imagery, through to calculations of wind flow and air conditioning for sustainable and carbon neutral buildings!

For more information about the More Maths Grads project or for general enquiries please visit: www.moremathsgrads.org.uk and www.mathscareers.org.uk



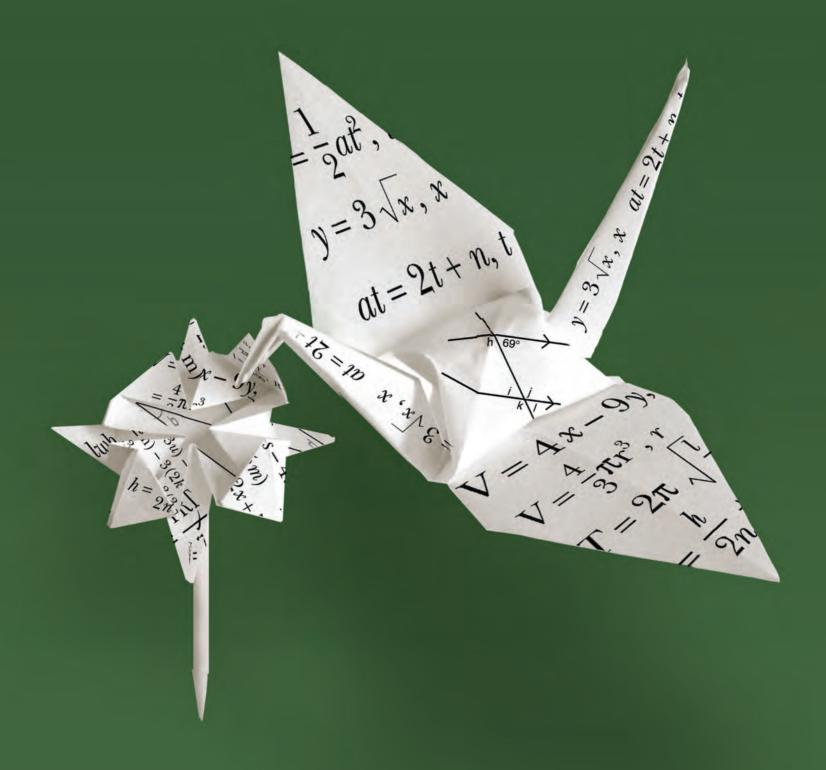
# SEE THE MATHS IN AEROSPACE



Modern aerospace arguably began with the Wright brothers' first powered flight at Kitty Hawk in 1903. With maths at the heart of everything we do, let aerospace engineering take you away to a new high!

From analysing and developing flight paths to design of spacecraft and aerodynamics – it all adds up to the maths you can deliver.

for more information about the More Maths Grads project or for general enquiries please visit: www.moremathsgrads.org.uk and www.mathscareers.org.uk

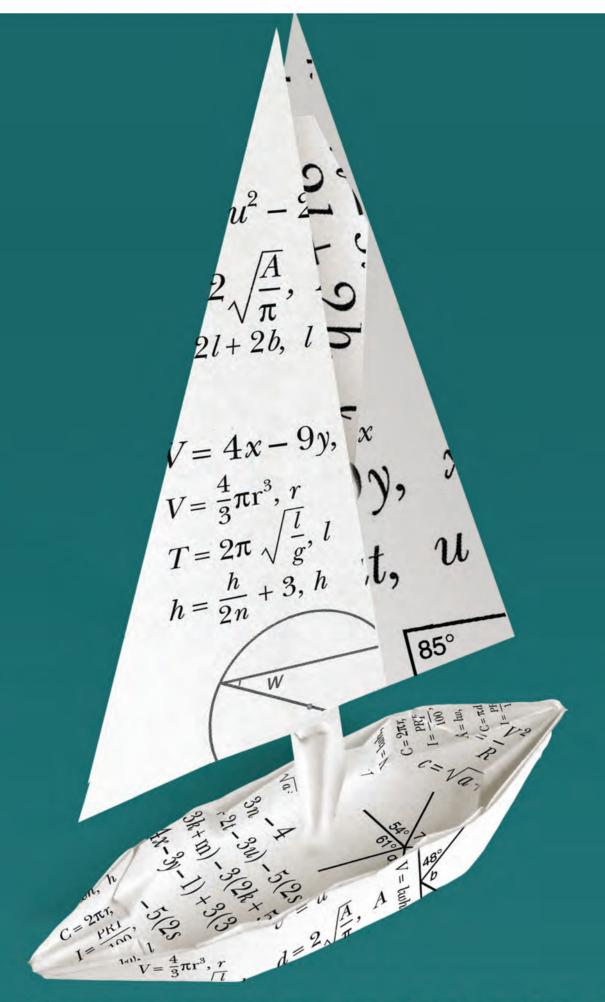


# SEE THE MATHS IN NATURE



Did you know that most flowers have either 3, 5, 8, 13 or 21 petals? In fact the natural world is full of interesting maths. There are lots of mathematicians busy battling with nature or giving her a helping hand. Whether it's predicting avalanche flows or fighting global warming, maths is needed everywhere.

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# SEE THE MATHS IN NAVIGATION



Getting from A to B is simple when you rely on your Sat
Nav or let Air Traffic Control do the work. What you
don't see are the people developing software,
modelling satellite movements and tracking aircraft.
And what you see even less of is the maths they rely
on – you wouldn't get to your destination without it!

for more information about the More Maths Grads project or for general enquiries please visit: www.moremathsgrads.org.uk and www.mathscareers.org.uk

# Careers in Math









# If you like Math, consider one of these careers.

Accountant

Actuary

Architect

Automotive Technician

Bank Manager / Teller

Carpenter

Computer Programmer

Electrician

Engineer

Financial Planner

Insurance Agent

Loan Officer

Machinist

Meteorologist

Physicist

Statistician

Systems Analyst

Teacher / Professor

Tool and Die Maker

Website Developer





# NASA Astronauts pilot rockets of enormous power into deep space this takes huge courage and initiative, Prove your Potential:

Your Space Shuttle is returning to earth but sustained damage during the mission it now has a faulty rocket booster, you need to lose weight deploy some of your oxygen tanks, you cant get rid of too many or you will run out of air before you land...

Time Before Landing - 200 Minutes

Number of Tanks - 4

Amount per Tank - 75 Minutes

Discover where else maths can propel you at www.mathscareers.co.uk



Your Formula 1 car is close to its final pit stop of the race it is your job to judge the volume of the refuel if overloaded the car will be too heavy and won't go fast enough if underloaded it will run out of fuel before the checkered flag...

Cars Efficiency - 12 Miles / Litre

Lap Distance - 3 Miles

Remaining Laps - 30

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It's about finding business solutions to life's uncertainties and making financial sense of the future

Mathematicians make **great programmers** — they think through all the consequences and come up with the best solution

Computer programmer

We predict the weather using numerical analysis and computer modelling techniques

Weather forecaster

We **protect public health** by using statistics to decide if a new medicine is safe and works well

Medical statistician

OSENS OPENS Logistical planning and analysis are essential for successful military operations I use complex equations to understand financial risk in the stock market

We can make cars go faster by applying aerodynamics in

to a variety of exciting careers

Find out more in the 'Careers with maths' Library, from Plus, the free online maths magazine

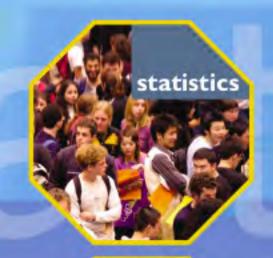
http://plus.maths.org/careerslibrary/

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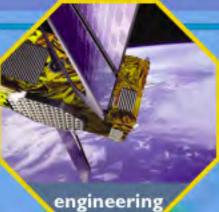
# MATHS

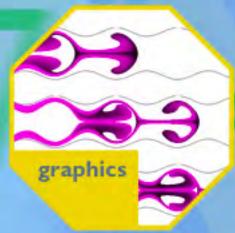
environment

Matters....



















food technology





IT ALL ADDS UP TO A GREAT CAREER find out more at http://www.mathscareers.org.uk