Where can maths take you?

Sectors of business and industry that use maths

We have identified 10 sectors of business and industry that are maths-based. We've written a description for each to help convey to your pupils what each sector is, examples of jobs, and also where their maths curriculum links to the sector.

We know that maths can change the world, and that young people care about this, so we have included a second description which showcases some of the United Nations Sustainable Development Global Goals (SDGs)

Educators may find this resource useful in deciding which sector to choose for an encounter, in preparing pupils for their M4G encounter, to inform their lesson planning and add context to their lesson. It could also be used to base a research task for pupils.

The Sectors

1. Banking & investment management	6. Engineering & construction
2. Insurance & accounting	7. Energy & environment
3. Sciences	8. Transport & aeronautics
4. Medicine & healthcare	9. Economics (government, industry, social and retail)
5. Manufacturing & product design	10. Computing, technology and communications

1. Banking & Investment Management

Banking encompasses two main areas; commercial banks and investment banks. Commercial banks enable people and businesses to save and borrow money, including for mortgages. Investment banking buys and sells companies as well as trading on the stock exchange. Whatever path you follow in this industry you could be using various quantitative skills you've developed in school across Number, Algebra, Ratio, Probability and Statistics. A career in investment banking could see you using data in the form of statistics or various charts and formulas to help you to decide where to invest money to make a difference in developing affordable clean energy to support action against climate change.

2. Insurance & Accounting

Everybody needs accountants for businesses, governments and people. Depending on the role, accountants are required to keep track of income and expenses, pay taxes or to check whether they're making a profit or loss. Working in insurance covers everything from insuring life, holidays, property, businesses. People take out insurance to protect themselves from natural disasters, interruptions or death. Whatever role you take in this industry you could be using various quantitative skills you've developed in school across Number, Algebra, Ratio, Probability and Statistics. You could be supporting the work in prisons to enable effective peace and justice systems or working on supporting climate change and sustainability.

3. Sciences

Sciences cover physics, biology, chemistry, zoology, botany as well as other areas. Looking at how the world works, what it's made up of and where we fit within space. Biologists, geneticists and other scientists play an essential role in developing good health looking for cures for cancer and other conditions as well as ensuring vaccinations are safe and work effectively. They use maths to model behaviours of cells and use reasoning and analytical skills to solve problems. If you followed a career in physics you could be using formulae and standard form to understand the distances between galaxies or the size of planets; in biology, modelling how bacteria change over time using graphs and equations; or statistics in analysing data in psychology to understand human behaviours. Whatever role you take in this industry you could be using various quantitative skills you've developed in school across Number, Algebra, Geometry, Ratio, Probability and Statistics.

4. Medicine & Healthcare

A career in medicine or healthcare covers everything being a nurse, midwife, doctor, surgeon, healthcare assistant as well as many other roles. Depending on your chosen career within this sector you could be using formulae and general arithmetic to ensure a patient receives the correct dose of medication; graphs to ensure a child is developing at an expected rate; statistics and formulae to ensure vaccines are effective and safe to use, or mathematical modelling of the heart using equations to identify any illnesses or conditions that may need treating. Whatever role you take in this industry you could be using various quantitative skills you've developed in school across Number, Algebra, Geometry, Ratio, Probability and Statistics.

5. Manufacturing & Product Design

Product design is the process that designers use to match business goals with things that users need in order to make successful products. Manufacturing is the process of bringing those products to life. Product designers can play an important role in creating a sustainable future by creating products that serve a purpose to the consumer whilst ensuring they look after the environment or even contribute to reversing the effects of climate change. This could be through clever use of materials or reducing the amount of waste produced. Many geometrical skills including trigonometry, surface area, volume, and constructions are required in both the design and manufacturing parts of the process. Other areas of maths such as ratio, percentages, probability and statistics are also frequently used throughout the design and manufacturing processes. Equations are used to gauge the strength of materials and understand chemical reactions so you can create new products from raw materials. Whatever role you take in this industry you could be using various quantitative skills you've developed in school across Number, Algebra, Geometry, Ratio, Probability and Statistics.

6. Engineering & construction

Engineers use science and maths to solve real-world problems. Engineering covers a vast array of careers from architecture and civil engineering, to chemical engineering and much more. Whether it's trigonometry in land surveying or equations to understand chemical processes, whatever path you follow in this industry you could be using various quantitative skills you've developed in school across Number, Algebra, Geometry, Ratio, Probability and Statistics. Within engineering, you could have an impact on developing clean energy solutions, designing innovative eco-friendly infrastructures or improving water and sanitation in developing countries.

7. Energy & Environment

The future of our environment and creating sustainable energy sources are heavily dependent on maths. Equations and graphs can be used to observe and predict how algae behave and how much there is in certain areas. Algae is a renewable energy source that can be farmed to support the energy we use sustainably. Decisions about investing in wind farms and where they are built use statistics, probability and formulae. Those same skills to help in predicting how useful and profitable they will be. Filtration systems used to ensure we have clean water rely on maths to identify scales of contaminants and how much of certain substances it is safe to consume. Mathematical modelling and statistics are used to predict how fast changes will impact the environment, for example, the use of palm oil leading to deforestation and the extinction of orangutans, or how the cultivation of cotton in certain areas causes soil degradation, increasing the chances of drought. Whatever role you take in this industry you could be using various quantitative and analytical skills you've developed in school across Number, Algebra, Geometry, Ratio, Probability and Statistics.

8. Transport & Aeronautics

In aeronautics and space travel, maths is key to understanding how these machines function to keep the pilots, passengers and everyone else safe. Have you seen the movie Hidden Figures? Katherine Johnson played a pivotal role, using her maths skills and knowledge to move NASA forward in its space mission. Initially, blueprints for physical designs of vehicles will be drawn up using geometry and algebra before they can be brought to life. Once they're at the stage of being tested, probability and statistics will be used to check safety and feedback to make amendments. The modelling and calculations used in creating transportation systems will continue to be vitally important in improving climate change and ensuring a cleaner world for us all to live in. Whatever role you take in this industry you could be using various quantitative skills you've developed in school across Number, Algebra, Geometry, Ratio, Probability and Statistics.

9. Economics (government, industry, social and retail)

Economics covers many areas including government, industry, social and retail. Modelling using formulae and graphs as well as knowledge from probability and statistics are used in decisions made about taxes to be paid by individuals and businesses to sustain the economy. Formulae, graphs, and ratio will all be used in deciding what products to include in shops. The introduction of 'wonky veg', for example, helps to reduce hunger with cheaper products available for the consumer while contributing to increased profits for the shops and farmers. Maths is used throughout the retail industry at every level. For sales assistants this might include basic arithmetic, working out measurements and unit price of goods or services, percentages for tax and discounts. In other roles within the industry, you may be required to work with time-series

graphs, understand profit and loss statements and use numbers and graphs to analyse information about how customers shop or to project how much stock to buy. You could be using various quantitative skills you've developed in school across Number, Algebra, Geometry, Ratio, Probability and Statistics.

10. Computing, Technology & Communications

Computing, technology and communications is a rapidly changing sector. The internet, credit cards, machinery and payment systems like bitcoin all depend on many aspects of computer programming which is built on a foundation of mathematics. Mapping technologies can help map safe routes for aid trucks to support humanitarian work in countries suffering from hunger, conflict or natural disaster. Pythagoras, trigonometry, and geometrical formulae might be used in technology to create machinery, cars and developing infrastructure. Programs are also important for the running of the NHS and can play an important role in climate change, modelling bird migration or plant diseases and predicting outcomes in a pandemic. Whatever role you take in this industry you could be using various quantitative and analytical skills you've developed in school across Number, Algebra, Geometry, Ratio, Probability and Statistics.