

STEM Careers – Hasmonean High School

Information and guidance



STEM Science, Technology, Engineering, Mathematics

STEM stands for **Science, Technology, Engineering and Maths**.

In challenging times and an era of expensive university education, a career that combines excitement, interest, a challenge with better pay and long-term career prospects has got to be effective. Science and technology make a vital contribution to health and well-being, and STEM underpins the performance of the science, health, IT sector and engineering industries.

STEM is vital because of expanding scientific frontiers, new product development and accelerating technological progress. STEM is critical in computer systems design, scientific research and development, and high tech manufacturing.

Whether you are reading this career guide as someone considering a STEM career already, considering a course involving STEM subjects, a pupil at school, university graduate or as the parent or grandparent of a child approaching a decision point in their career, STEM is an area receiving a lot of attention from both business and government.

In the UK women are unrepresented in STEM jobs, and there is a cultural bias towards the medical profession. STEM is a vast area and includes; subjects allied to medicine, biological sciences, agricultural and related topics, physical sciences, mathematical sciences, computer science, engineering and technology and architectural building and planning. Source = Joint Academic Coding System (JACS)

Those STEM graduates working in Science enjoy a wage premium and Financial occupations and further qualifications can help you achieve a premium salary. The shortage of STEM skills also makes it easier to work in America than in some other job areas, so that shortages can be combatted. STEM jobs include computer support specialists, computer programmers, civil engineers, mechanical engineers, natural science managers, physicists, agricultural and food science technicians, software publishers, biochemists, chemists and pharmaceutical and medicine manufacturers.

In the US for example, 2.1 million new jobs in STEM are predicted between 2010 and 2020. Source = US Bureau Labour Statistics. STEM-related jobs include; auditors, financial consultants, underwriters, science administrators, policy advisors, science teachers, and business managers in healthcare and conservation.

There is a significant shortfall of STEM skills compared with the demand. STEM-trained employees have useful transferable skills; written communication, numeracy, understanding risk and probability, adopting a logical and rigorous approach, analytical, problem solving ability. These skills are highly marketable into different careers as well as self-employment.

Employment in the US in computer systems design/related services is increasing by + 47%, fuelled by demand for sophisticated computer networks and mobile technologies.

13 Tips for a successful career in STEM:

- 1- Ensure your Maths and science are up to scratch – get extra tutoring if necessary
- 2- Make sure you research courses before making a decision
- 3- Put the Big Bang Fair in your diary for this/next year
<http://www.thebigbangfair.co.uk/home.cfm>
- 4- Check out the National STEM centre www.nationalstemcentre.org.uk
- 5- Take a look at STEM Net www.stemnet.org.uk
- 6- Investigate STEM Clubs www.stemclubs.net
- 7- Speak to people who work in STEM jobs
- 8- Find out what courses and universities employers rate
- 9- Make sure that your non-technical skills crucial for employability are up to scratch
- 10- Get your hands on a copy of the Telegraph's Career of the Future supplement and look at their jobs site
- 11- Check out any assumptions you have about what specific jobs and sectors are like – get your facts straight, or you might miss out on great opportunities.
- 12- Keep an eye out for the latest news and check the Telegraph jobs in engineering listings as posts are uploaded daily
- 13- If you are female and looking for career inspiration then do check out the new telegraph jobs women in space STEM resource which lists historical women to have gone to space on missions and modern women who work in the space industry at present.

Science, research, engineering and technology jobs are expected to grow at double the rate of other occupations creating 142,000 jobs between now and 2023, according to a new report published this week by the Social Market Foundation and EDF.

The study – **Jobs of the Future** – was commissioned by EDF Energy as part of its ‘Pretty Curious’ programme, which aims to change the perception of science, technology, engineering and maths subjects and inspire more young women to consider associated STEM careers.

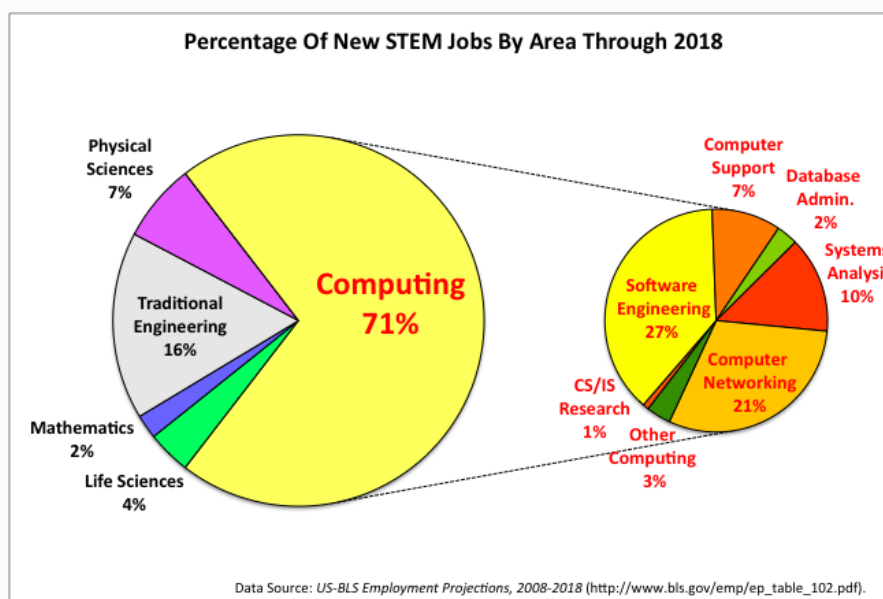
The report used new analysis of government data and examines trends in the growth of science, research, engineering and technology jobs. The research predicts that computing skills will be the most in demand with the highest number of new jobs (25%).

Key findings:

- There will be 142,000 new jobs in science, research, engineering and technology from now to 2023
- Jobs in science, research, engineering and technology fields will grow twice as fast as other careers (6% versus 3%), driven by factors including the pace of infrastructure investment and digital innovation
- Current figures show there will be a shortfall in the number of graduates and apprentices available to fill these roles. For example, there will be a 40% shortfall in engineering
- Getting more young women to consider these careers is essential to the success of UK industrial strategy – currently women are less than a quarter of the workforce in four of the five most in-demand industries
- Future jobs include: computer coders; geotechnical design engineers; intelligence consultants; robotics engineers, and data scientists

Demand for traditional science and engineering-focused areas, such as R&D and specialised construction are expected to remain high, driven by government’s commitment to ongoing investment in infrastructure.

However, even areas such as retail, PR, consultancy and legal, and financial services are tipped to raise demand for science, research, engineering and technology skills between now and 2023.



STEM Labour Market

72% of UK firms employ STEM skilled staff, but **not enough people are studying STEM subjects** to meet growing demand.

STEM skills are **vital** to areas of future growth and employment including advanced manufacturing and low carbon industries.

But, 45% of employers are currently having **difficulty recruiting** STEM-skilled staff, with 59% expecting difficulty in the next 3 years.



Consequently young people need to understand the relevance of STEM knowledge and skills to everyday life.

It is vital that careers practitioners help young people to understand the importance of STEM subject choice and their impact on progression opportunities.

What's great about STEM careers?

Good employment prospects

Today, the UK faces a skills shortage in STEM. This is bad news for the country. If this continues, there will not be enough people in fields such as engineering, medical research and even healthcare to meet our needs and keep the economy going.

The upside is it is good news for STEM graduates and apprentices as it means there are plenty of jobs for those with STEM qualifications.

STEM skills are flexible

If you studying engineering, you end up in engineering – right? If you study computer science, you have to be a programmer?

Not necessarily. While it's true that STEM subjects – whether studied at university or through an apprenticeship – lead towards a particular career, the skills you pick up are very transferable. That means you can apply them to lots of different jobs.

'Great transferable skills mean all students should consider studying 1+ STEM subject'

Here are some of the skills you'll pick up by studying virtually any STEM subject:

- Problem solving.
- Lateral thinking.
- Critical thinking.

According to research by Kent University, analysing and investigating is the fourth-most sought after skill by employers.

You can make a difference



The sheer breadth of STEM roles means there's bound to be something you care about. Here are just some of the ways you could make a difference by pursuing a STEM career:

- Protect wildlife as a biologist.
- Tackle global warming as a climate scientist.
- Develop new treatments for disease as a chemical engineer.
- Help treat and cure patients as a doctor or nurse.
- Develop greener ways of powering vehicles as an automotive engineer.

You can earn a lot of money

When UK Business Insider listed the ten degrees which lead to the highest-paying jobs, all of them were STEM. Civil engineering topped the list, with graduates earning an average of £45,000 per year, and maths came in at number 10, with typical yearly earnings at around £39,000.

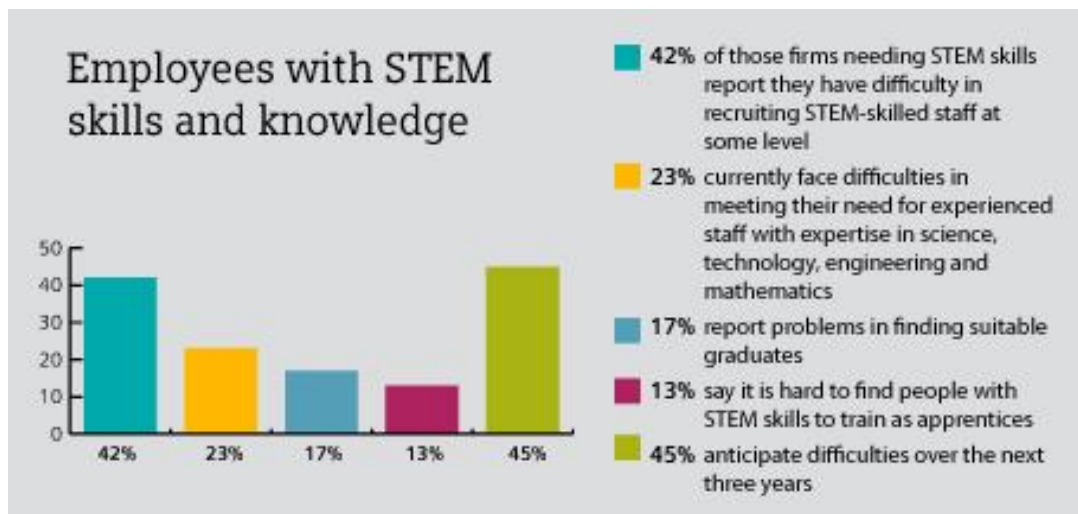
Do I have to go to university?

No.

Many employers are offering higher and degree apprenticeships as a way into STEM careers such as engineering, IT and accountancy.

You'll need to have A-levels in STEM subjects, but instead of studying at university, you'll train in the workplace and work towards academic and vocational qualifications at the same time.

Many STEM careers do require a university degree, such as doctor, nurse, research scientist, and marine biologist.



Promoting STEM careers to young women

To meet the increased demand for roles, it's vital that more young women elect to study STEM-related subjects at school, further education and higher education.

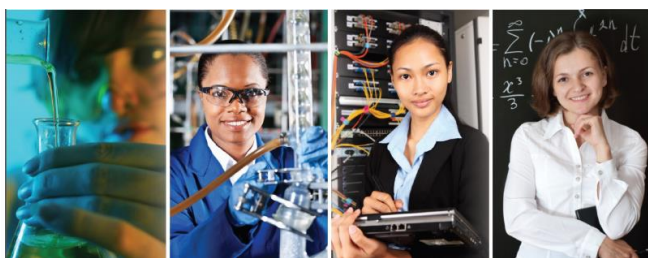
EDF estimate that less than one-in-five (19% or 462,000) people working in science, research, engineering and technology are women. Were the number of women to match that of men working in industry, the number would be upwards of 1.2 million.

Chief information officer at EDF Energy, Sarah Flannigan explained: "We rely on the talents of people with a variety of STEM skills and recognise the critical need to inspire more young women to enter these fields.

"That is why we're aiming to increase our intake of female STEM apprentices to 30% by 2018 and we hope by using innovative technology that appeals to teens, we will reach more girls and inspire them to consider science and technology careers."

Stephanie Fernandes, of the Institution of Engineering and Technology (IET), commented: "In the wake of the Brexit vote and the government's ambitious and welcome commitment to invest in science and innovation to boost the UK's productivity, there has never been a more important time to tackle the fundamental engineering skills gaps and shortages in the UK head on.

"It is also a great time to be an engineer: demand far outstrips supply, salaries are rising and there are fantastic career prospects for tomorrow's engineers. But we cannot rely on these factors to attract enough engineers to address the growing skills shortage in the UK.



STEM. It's an acronym you've probably heard. But did you know that those four little letters are important to you whatever you plan to do in your career?

We'll tell you why – but first, let's answer the question “what are STEM subjects?”

What are STEM subjects?

STEM stands for:

- Science.
- Technology.
- Engineering.
- Maths.

At school or college, the list of STEM subjects is pretty big:

- Biology.
- Chemistry.
- Physics.
- Design and technology.
- Maths.
- Information and communications technology (IT or ICT).
- Computer science.
- Economics.
- Geography.

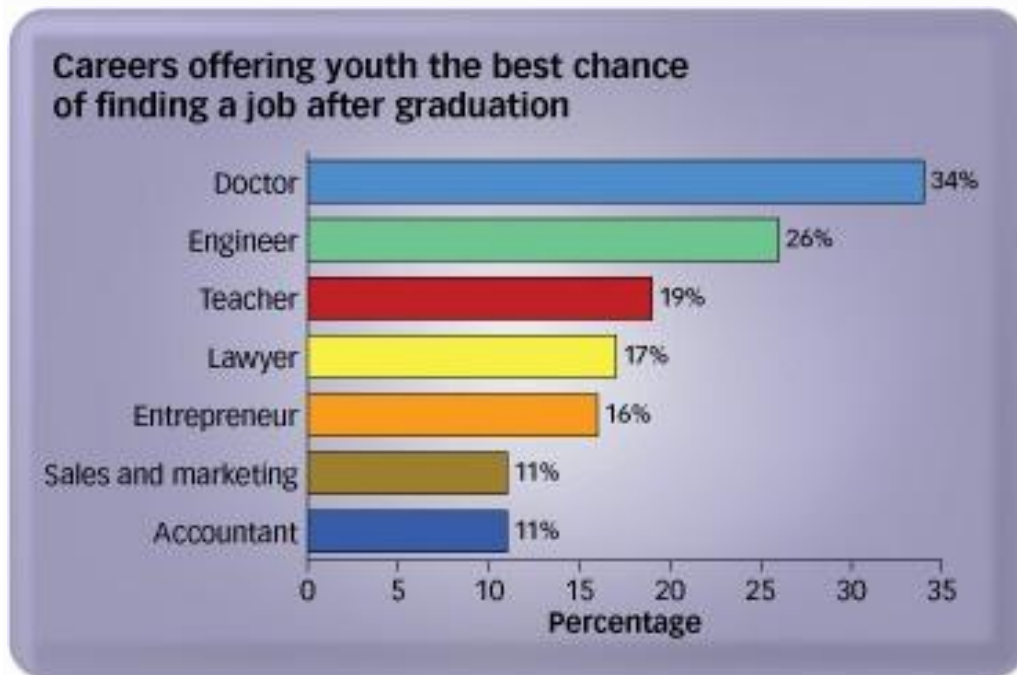
STEM subjects are important because they form the basis of a huge number of careers. Some of these jobs might be obvious – like research scientist, doctor, engineer and accountant. But others – such as software developer, pilot, architect – are not so obvious. That's why it's so important to think carefully about your career plans when choosing your GCSEs and A-levels. STEM subjects also give you loads of transferable skills which you can apply in any career.

STEM careers are creative

Many STEM careers need creativity as much as the more analytical skills traditionally associated with STEM subjects. Most STEM roles are about coming up with solutions to problems – and problem solving is often about thinking creatively or “outside the box”. Take architecture – it's a core STEM career. Architects use complex maths every day. And yet it's one of the most creative careers out there. It's a perfect examples of where maths and creativity come together.

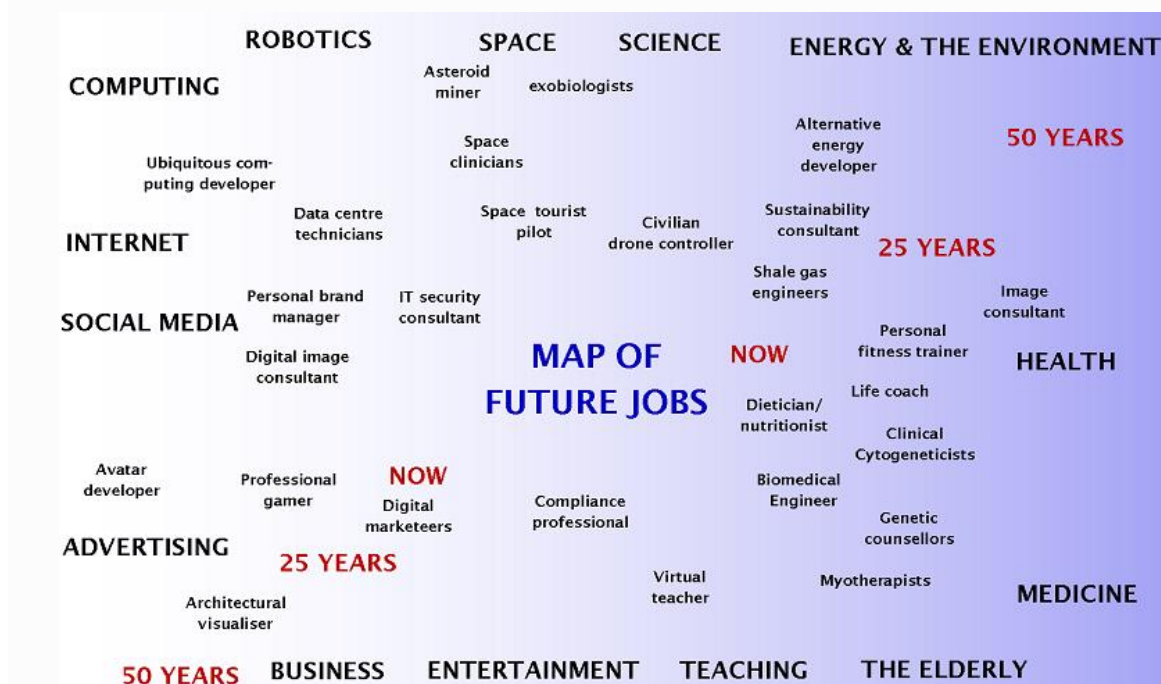
At the same time, STEM subjects require research, attention to detail and a critical approach which is useful in any profession or subject. This means STEM and arts/humanities subjects complement each other well at A-level, as skills gained in one can improve your approach to the other.

There's even a campaign going on at the moment to rename STEM "STEAM" to include the artistic and design skills needed in many STEM-based careers.



What careers can STEM subjects lead to?

The breadth of careers STEM subjects can lead to is actually pretty breath-taking.



Here's a mix of the everyday – and the out-of-the-ordinary. We've even included a guide to the school/college subjects you must study to go into each profession:



- **Space scientist:** From astronauts and rocket scientists to meteorologists and climate scientists, space scientists study the Earth's atmosphere, as well as outer space and the things in it. **Must study:** Physics.
- **Doctor:** General practitioners see patients locally to diagnose illnesses, while consultants specialise in a particular area of medicine, and surgeons carry out operations. **Must study:** Biology.
- **Civil engineer:** Design the buildings, roads, bridges and other infrastructure. Must study: Maths.
- **Accountant:** Prepare and look at companies' accounts: that is, the money they spend and receive. **Must study:** Maths.
- **Web Developer:** Use computer programming languages to build and improve websites and online apps. **Must study:** Maths.
- **Marine biologist:** Studies sea creatures, from their behaviour and the way they interact, to the impact of humankind. **Must study:** Biology.
- **Automotive engineer:** Design and improve land vehicles like cars, lorries and vans. **Must study:** Maths.
- **Chemical engineer:** Make and improve medicines, household products like detergents, and cosmetics, which involve the use of chemicals. **Must study:** Maths.
- **Architect:** Come up with the designs for buildings and other things in the built environment, from bridges to football stadiums. **Must study:** Maths.
- **Statistician:** Use information to draw conclusions about the real-world. Must study: Maths.

Spotlight on

STEM

Science, Technology, Engineering and Maths



Gyrfa Cymru
Careers Wales



What is STEM?

Can you see yourself designing a wind turbine or building the next Airbus; developing new drugs or a high performance textile; or maybe, filming the next Doctor Who?

Why study STEM?

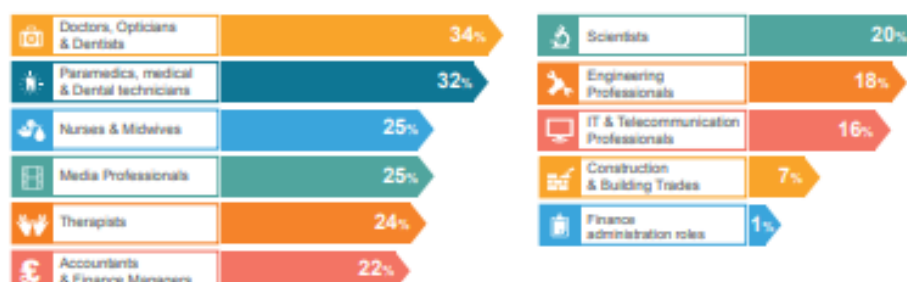


1 in 5 new jobs in the UK by 2022, will be STEM jobs.

By 2022 Wales needs ...



Fastest growing STEM jobs of the future



Exciting job opportunities



Geneticists, Environmental Scientists, Chemists, Engineers, Nurses, Skilled Technicians, Marine Biologists, Textile Technologists, Doctors, Accountants, Designers, Skilled Construction Trades, STEM Teachers, Therapists, Computer programmers

What can I earn?

Salaries vary depending on experience and location.



Some examples:

Chartered Accountant	£45 - 62k
Doctor	£28 - 101k
Systems Developer	£24 - 46k
Marine Biologist	£22 - 47k
Nuclear Engineer	£22 - 42k
Qualified Teacher	£22 - 37k
Wind Farm Technician	£19 - 33k
Nursing	£18 - 47k
Graphic Designer	£18 - 35k
Animal Technologist	£15 - 28k
Vehicle Mechanic	£15 - 27k

Do I need Welsh language skills?



High demand for Welsh skills



Media
Creative Industries
Health & Social Care
Finance

The Benefits of STEM Education



Engage and Inspire

STEM Learning has found activities such as workshops, exhibitions and career talks dramatically improve students' awareness and engagement in STEM subjects, promoting a deeper understanding of the scientific and technological concepts that influence how the world works

The shortage of STEM skills in the workforce is one of the UK's key economic problems
-NAO, 2018

A further 700,000 STEM technicians are needed by 2024 to meet employers' demands
-Gatsby Foundation, 2017



Enrich the Real-World

STEM education is a means to improve understanding and maximise engagement in key aspects of society, and can be consolidated with external resources and events, such as British Science Week and the CREST Project which develop skills for the employment market such as problem-solving and teamwork

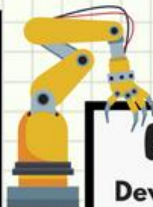
Prepare for Technological Advances

Practical lessons and competitive schemes contextualise STEM skills into the wider employment market, as well as promoting understanding of scientific concepts, enabling students to be at the forefront of technological change

68% of students found their science lessons interesting, but just 43% were interested in science as a career
-Wellcome Trust, 2016

Change Perceptions

Challenge existing stereotypes and dispel myths on the type of person that works in STEM with role models, including STEM Ambassadors, with diverse backgrounds and skill sets allows students to identify themselves will increase the likelihood of pursuing STEM education and careers



Empower Students

Develop confidence and resilience as students are reminded that mistakes are a normal and important part of the learning process in STEM education, and are empowered to believe in their abilities and personalities through lessons and enrichment schemes

58% of students would prefer to do more STEM practical work
-Wellcome Trust, 2016

PROMOTING STEM IN SCHOOLS
10th July 2018
London



INSIDE GOVERNMENT

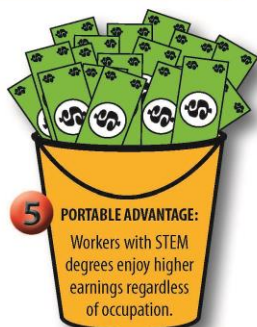
What's so great about a STEM Education?

Why is everyone talking about the importance of Science, Technology, Engineering and Mathematics - STEM - education? Here are **7 great reasons:**

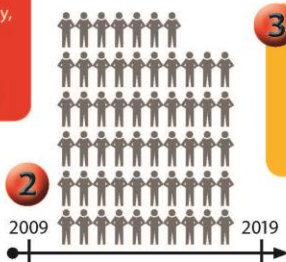
NEW JOB GROWTH IS IN STEM:

1 11%

of total new job growth between 2009 and 2019 in Minnesota will come from STEM occupations



5 PORTABLE ADVANTAGE:
Workers with STEM degrees enjoy higher earnings regardless of occupation.



2

2009 2019

GREAT ENTRY-LEVEL OPPORTUNITIES: Between 2009 and 2019, employers are expected to hire over 57,700 STEM workers who are entering their occupation for the first time.

HIGHER EARNINGS:

Average STEM wage:

\$77,880

VS.

6 Average non-STEM wage: **\$43,460**

3

FASTEST GROWING JOB MARKET:

Over the past 10 years, growth in STEM jobs was 3X greater than that of non-STEM Jobs

STEM **↑** **non-STEM**



4

BETTER COLLEGE ENROLLMENT & GRADUATION RATES

99% of STEM school graduates enroll in college within one year of high school while 79% complete college in four years.



7

STEM SKILLS ARE IN DEMAND:

In Minnesota, STEM skills have stayed in demand even through the economic downturn.

mhta
Driving Innovation & Technology
www.mhta.org

Want to learn more? Contact info@mhta.org

Sources: MN Department of Employment & Economic Development, United State Department of Commerce, National Research Council, Change the Equation.org, and U.S. Department of Labor Bureau of Labor Statistics