

## The STEM Project

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### The STEM Network

STEMNET is a national network that creates opportunities to inspire young people in Science, Technology, Engineering and Mathematics; otherwise known as the STEM subjects. It is funded by the Department for Business, Innovation, and Skills (BIS) and the Department for Children, Schools, and Families (DCSF).

### The STEM skills shortage

In a recent poll carried out by STEMNET, 88% of the scientists surveyed said they believe that the UK is facing a STEM skills shortage which could leave the next generation ill-equipped to tackle major scientific and technological challenges.

In his response, Lord Professor Robert Winston <sup>1</sup>, perhaps best known for his work in popularising science and medicine on television said:

*"Science and technology are increasingly vital in the world today and the study of these subjects benefits all of us whether we realise it or not. Scientists like me have a very important role to play in inspiring the next generation to see these areas as exciting – both through sharing experiences and offering young people the chance to get involved in practical work in a real-life scientific environment."*

### Current trends

In his introductory speech to a 2005 Royal Society Conference to address the issue of increasing uptake of science post-16, the Society's Education Committee Chair, Professor Patrick Dowling FRS <sup>2</sup>, drew attention to the then current decline. He indicated that despite a 12.1% rise in A-level entries for all subjects in England, Wales and Northern Ireland between 1991 and 2005, there had been large decreases in the traditional sciences and mathematics. He noted that 2005 A-level entries in physics, mathematics and chemistry were respectively 35.2%, 21.5% and 12.6% lower than in 1991, and that biology was the only exception to this trend, with entries in the subject rising by 15.8% during the same period.

To compound the issue, data produced by the Centre for Evaluation and Monitoring at Durham University as cited in The Tenth Report of the Parliamentary Science and Technology Select Committee, published in 2006 <sup>3</sup>, gave a measure of relative difficulties of A level subjects. The comparison was made between the expected A level UCAS points scores from a GCSE Grade B performance.

Of the subjects quoted, in physics, chemistry and biology the expected scores were among the lowest, some 20 points below the higher scoring subjects of business and sociology.

Dr Colin Osborne of the Royal Society of Chemistry <sup>4</sup> told the Select Committee that students "realize that they have to get a certain number of points to go to university, so often they choose subjects that are perceived to be (and indeed may be) easier".

According to Lord Drayson, Science and Innovation Minister <sup>5</sup> in his address to the Scientific-Economic Research Union conference in Berlin in May 2009 "We're seeing more young people

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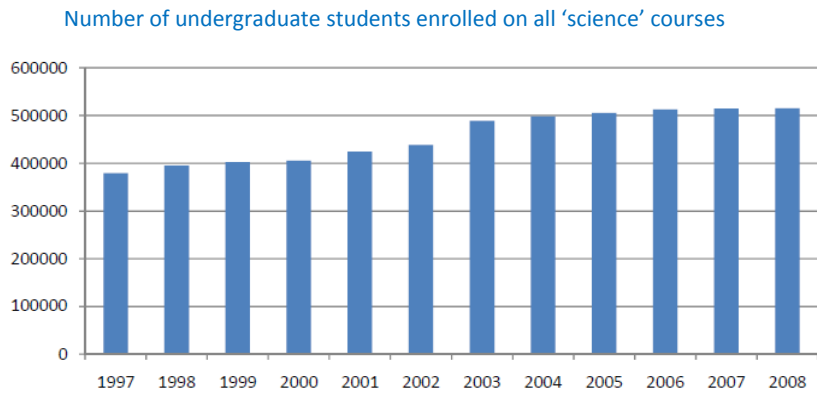
<sup>1</sup> <http://www.stemnet.org.uk/home.cfm>

<sup>2</sup> <http://royalsociety.org/publication.asp?id=4272>

<sup>3</sup> <http://www.publications.parliament.uk/pa/ld200506/ldselect/ldsctech/257/25705.htm>

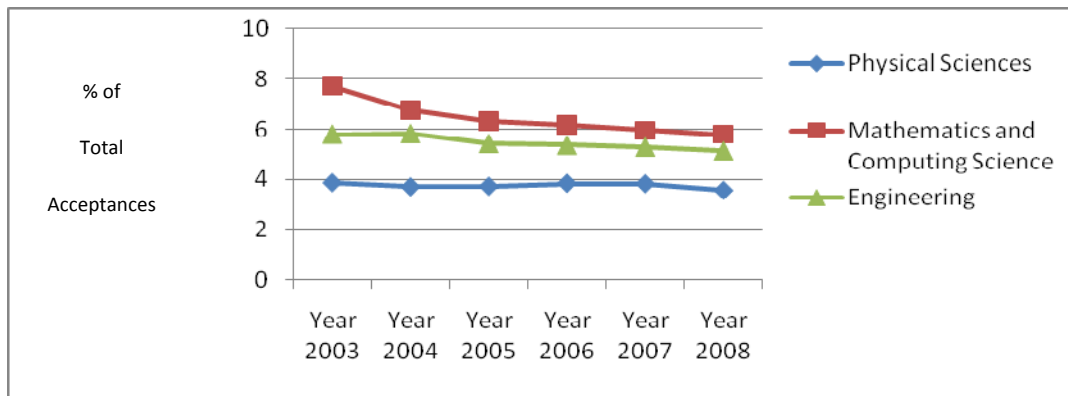
<sup>4</sup> <http://www.publications.parliament.uk/pa/ld200506/ldselect/ldsctech/257/25705.htm>

studying maths, engineering and the pure sciences at undergraduate level.” The chart used to illustrate the statement appears to show science subjects as thriving despite the slowdown in recent years.



When the increase in the university population as a whole and the wider subject range encompassed within STEM are taken into account the picture is less encouraging.

The data in the table below, compiled from statistics on the UCAS website <sup>6</sup>, shows the yearly percentage of the total cohort of students accepted on to a degree course classified using the Joint Academic Coding System (JACS). The trends are not surprising considering the decline in numbers taking STEM subjects at A level.



The effect these trends are having on the employment market can be exemplified by the findings of a Confederation of British Industry (CBI) Education and Skills Survey in 2009 <sup>7</sup> which found that 59% of employers reported they were having difficulty recruiting enough STEM skilled individuals to meet their needs.

### So why are young people not engaging in STEM subjects?

In 2008, research carried out on behalf of the Institute of Engineering and Technology (IET) <sup>8</sup> concluded that pupils' key requirements in STEM lessons were as follows:

<sup>5</sup> Innovation Recession and Recovery, Speech by Lord Drayson to the Scientific-Economic Research Conference in Berlin May 2009.

<sup>6</sup> [http://www.ucas.ac.uk/about\\_us/stat\\_services/stats\\_online/data\\_tables/subject](http://www.ucas.ac.uk/about_us/stat_services/stats_online/data_tables/subject)

<sup>7</sup> Confederation of British Industry/Nord Anglia, Education and Skills Survey, 2009

<sup>8</sup>

- More exciting, engaging lessons in STEM subjects;
- More real life application of learning across all subjects, including STEM ;
- More understanding of specific careers including Engineering, covered within ongoing lesson formats;
- Quality of teacher still remains very high on the list of factors influencing subject preference, particularly those teachers that employ more active participation in their lessons;
- Outside speakers, fun experiments, educational games, Science Mentors (older pupils), Interactive quizzes, were all seen as important components of exciting and engaging science lessons;
- More detailed knowledge of science based careers, more understanding of the various branches and career options within Engineering.

The facts are quite stark. Fewer young people are choosing to study STEM subjects, pupils can find it hard to engage in STEM lessons at school without a context for learning and UK PLC is facing a potential skills gap.

These concerns have been embraced by Government. In the Tenth Report of the Science and Technology Select Committee <sup>9</sup>, in Chapter 2.4, it states “The Government set some ambitious targets to increase the numbers of students taking science and mathematics A-levels. By 2014, it is hoped that entries to A-level physics will have increased to 35,000 (currently 24,094), entries to chemistry to 37,000 (currently 33,164) and entries to mathematics to 56,000 (currently 46,037)”

STEMNET has also engaged with the problem and there is now a network of regional STEM contract holders who have been tasked to drive the STEM agenda in their region. The University of Worcester is the STEM contract holder for Herefordshire and Worcestershire.

### **STEM Ambassadors**

One of the responsibilities of a contract holder is to recruit what are called **STEM Ambassadors**. The aim of the programme is to specifically address the issue of context for young people. It is hoped that by working in school with an adult who has a career in STEM and seeing the passion and enthusiasm that they have for their work, more young people will engage better in STEM lessons and go on to enter STEM related careers and thus fill the skills gap. The qualifications for being an Ambassador are easily met.

If you are a person who has an interest in STEM related subjects, are enthusiastic, are a good role model and would welcome a new and exciting challenge, you are ideally matched for the job. Working as an Ambassador is a perfect opportunity to share your enthusiasm for your subject and to inspire the next generation of Scientists, Engineers, Technologists and Mathematicians. It is also an opportunity to give something back to the community and develop links with local schools as well as contributing to your personal and professional development.

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<sup>9</sup> <http://www.publications.parliament.uk/pa/ld200506/ldselect/ldsctech/257/25705.htm>

Typical activities might be:

- Linking with schools or colleges to create long-term partnerships;
- Assisting with delivering Enhancement & Enrichment schemes from the STEM Directories;
- Mentoring students on specific projects – within the curriculum or beyond;
- Working with pupils at a STEM Club activity;
- Offering careers advice during a school careers event;
- Engaging in STEMNET activities advertised through the national newsletter e.g. case study for STEMNET website, Leading Lights etc;
- Supporting teacher Continuing Professional Development (CPD) – working with Science Learning Centres, the National Centre for Excellence in Teaching Mathematics (NCETM) etc.

### **Registering as an Ambassador**

If you would like to register as an Ambassador the procedure is quite straightforward. Initially you register an interest on the STEMNET website (see details below) <sup>10</sup> and select Herefordshire and Worcestershire as the location in which you would like to work. The STEMNET office in Bredon will automatically be notified of your interest. We will contact you and invite you to an induction session which is normally held in University. During this session we will initiate the inevitable CRB check, paid for by STEMNET, and do a short induction session; the whole process only lasts about 30 minutes. Subsequently the STEM team will broker an activity for you to take part in and then you would be classed as **active**. You can do as much or as little as you like. You have the reassurance of being covered by a comprehensive insurance scheme when engaged in a STEM activity and you only need to do one a year to remain **active**.

Currently we have over 150 Ambassadors in our region, many of whom are University of Worcester staff, and we are hoping to recruit more.

If you would like more details call our Administrator, Sarah Davis on 855551 or email [stempoint@worc.ac.uk](mailto:stempoint@worc.ac.uk)

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<sup>10</sup> <http://www.stemnet.org.uk>