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## Learning Routes and Pathways

Keeping future options open by choosing a STEM learning route

## General Points

**Exciting opportunities are opening up for young people to develop their STEM skills and unlock talent through the following learning routes. All routes support progression to higher level learning and employment:**

- Apprenticeship route – is being expanded and strengthened
- Diploma route – this new qualification combines classroom learning with practical hands-on experience covering a broad employment sector
- A Levels – are being updated and strengthened to ensure they maintain their high standards and meet current needs. Some career options specify particular subjects as entry requirements, for example, to be a forensic scientist you need biology or chemistry, and physics is an ideal option for sound engineering.

## Apprenticeships

- Apprenticeships are being reformed. They are vital to give young people the skills they need to succeed in the global economy
- A greater allocation of funding is being provided for Apprenticeships, building on the Government's Skills Pledge to support the drive for increased skills to make the UK workforce more competitive. There is currently a skills shortage in processing and technician roles and this will increase significantly in the period up to 2017, which coincides with the lowest number of 16 –18 year olds in the population
- New frameworks are being developed and existing frameworks are being reviewed in response to the needs of employers.

**Apprenticeships which include STEM skills can be found in a diverse range of sectors, as shown in the following examples:**

- Administration and Professional – Accounting Apprenticeship
- Construction – Electrical and Electronic Servicing Apprenticeship
- Engineering – Heating, Ventilating, Air Conditioning and Refrigeration Apprenticeship
- Finance, Insurance and Real Estate – Providing Financial Services Apprenticeships
- Food and Drink – Food and Drink Manufacturing Apprenticeships
- Manufacturing – Chemical, Pharmaceutical, Petrochemical Manufacturing and Refining Industries Apprenticeships
- Transportation – Rail Transport Engineering Apprenticeship

For more details and to find a full list of Apprenticeships visit [www.apprenticeships.org.uk](http://www.apprenticeships.org.uk)

## Diplomas

[www.diploma-support.org](http://www.diploma-support.org) and [www.sciencesowhat.direct.gov.uk](http://www.sciencesowhat.direct.gov.uk)

### Diploma is a qualification that:

- offers a mix of classroom learning, creative thinking and practical hands-on experience
- involves a research-based project and at least 10 days' work experience with an employer
- covers a broad employment sector and builds essential skills while keeping all learning routes open
- has been developed in partnership with employers and higher education institutions.

### The Diploma is available at three levels:

- *Foundation Diploma* – is a level 1 qualification that is the equivalent of 5 GCSEs
- *Higher Diploma* – is a level 2 qualification that is the equivalent of 7 GCSEs
- *Advanced Diploma* – is a level 3 qualification that is equivalent to 3.5 A Levels. This level also has a Progression Diploma, which is the equivalent to 2 A Levels.

**By 2013 all students will be entitled to access all 17 Diploma subjects.  
The Diplomas relating to STEM skills available:**

#### *From September 2008:*

- Construction and the Built Environment
- Engineering
- Information and Technology

#### *From September 2009:*

- Business, Administration and Finance
- Manufacturing and Product Design

*From September 2011 Science at Foundation and Higher Level and from September 2012 at the Advanced Level.*



## STEM A Level subjects

**In terms of numbers of students studying STEM A Levels, the figures are as follows:**

**Physics** – from a high in 1982 of 58,000 students, numbers had declined to just over 27,000 by 2007

**Maths** – has shown a slight decline from 67,000 in 1996 to 60,000 in 2007

**Chemistry** – has remained more or less level at around 40,000 over the past ten years

**Biological Science** – has been a more stable area over the years; in 2007 there were 54,000 A Level entrants, making up 6.8% of the total number of A Level entries, and double the number taking A Level physics

**Other Science subjects** – significant growth in A Level entrants has occurred in the past twenty years in some science subjects. For example, in 2007, **psychology** had 52,000 entrants and there has been a similar dramatic rise in the number of students taking A Level **sports science/studies**.

## STEM degree subjects

### Applications

**The number of overall university applicants rose by 12.2% between 2002 and 2007, but STEM subject applicants rose by just 0.08%. Subject trends in degree course applications are as follows:**

**Physics** – has seen an encouraging rise in applicants from 12,830 in 2002 to 14,935 in 2007, but this is a very low base compared to e.g. psychology with 72,475 applicants in 2007

**Maths** – has seen a growth in applicants from 20,120 in 2002 to 28,590 in 2007

**Chemistry** – a stable number of applicants from 19,015 in 2002 to 19,585 in 2007

**Biological Sciences** – has attracted the largest number of applicants of all the STEM subjects, with a rise from 125,860 in 2002 to 164,215 in 2007; however, over two-thirds of the applicants are choosing psychology and sports science degree courses

**Engineering and Technology** – has shown a rise in applicants from 131,505 in 2002 to 140,580 in 2007.

## Acceptances

The table below indicates the number of acceptances onto STEM degree courses, and illustrates the low base of STEM degree numbers compared to more popular subjects such as psychology and sports science.

Degree subject	Number of acceptances in 2008
Physics	3,040
Maths	5,682
Chemistry	3,545
Biology	4,000
Mechanical engineering (the largest single engineering sub-discipline)	4,181
Psychology	12,908
Sports science	7,694

(Sources: Universities and Colleges Admissions Service (UCAS) and the Higher Education Statistics Agency (HESA)

Although the number of STEM graduates is lower than for many other subject areas, there is a much better chance of STEM graduates entering employment within that sector. Conversely, the number of, for example, psychology or sports science graduates entering employment directly related to their degree subject are significantly lower, as those employment sectors are much smaller.

The added value of a STEM degree is the flexibility that it brings in terms of employability. The CBI (Confederation for British Industry) Education and Skills Survey, 2008 found that there is high demand for STEM graduates in all employment sectors – with 92% of firms wanting people with these skills. Therefore, studying STEM subjects not only maximises career options in the STEM area, but also for careers not related to STEM.