

# SCIENCE OVERVIEW

WRITTEN BY JANICE MONTGOMERY



Graduates in Science, Technology, Engineering and Maths (STEM) are widely regarded as critical to the UK economy<sup>1</sup>, providing the impetus for new developments that will drive discovery in fields as wide as astronomy, technological innovation, healthcare and food science.

There are considerable differences between uptake in the various science disciplines and in their employment outcomes. This article examines the outcomes for science graduates in the cohort graduating in 2015, leaving the other STEM disciplines to be discussed elsewhere in this publication.

The UK Government's ten-year strategy for science and innovation, published in 2014, sets out a vision for improving STEM education in schools, a £5.9 billion budget for capital science funding and the development of world-class laboratories to ensure the UK leads the way in scientific exploration and development<sup>2</sup>. A more recent report concerning graduate employment and accreditation in STEM<sup>3</sup> has drawn attention to the increasing numbers of pupils at school who are taking STEM subjects, leading to an increase in undergraduate numbers from 76,000 in 2006 to over 98,000 in 2015<sup>4</sup>. Despite dips in 2012-13, the first intake of students to pay full fees, the report makes clear that the numbers across science subjects, such as chemistry and physics, have been steadily increasing over the last ten years<sup>5</sup>.

## Destinations

The data provided by the Higher Education Statistics Agency (HESA) shows that science has maintained and slightly increased its share of the overall undergraduate population, standing at around 7.9%. This figure masks considerable change within individual subjects with biology, physical and

geographical sciences and sports science all seeing a decline in graduating numbers, sports science in particular experiencing a drop of 1,400 students on the previous year. This could be attributed to being the first group to graduate from the entry cohort in 2012-13 who had to pay full fees and there is no doubt that that played a part in the overall reduction in new students that year and therefore graduates now.

However, physics is experiencing a positive resurgence with 400 additional students on the previous year and chemistry an extra 140. It is possible that in choosing subjects for study at undergraduate level, pupils (and parents) are influenced by the excellent rates of work and further study amongst previous graduates in these subjects, and in the more obvious correlation between study and vocational employment at a time when fee payment is sharpening the focus on return on educational investment.

Although science graduates have lower rates of immediate employment on leaving university, compared to the average of over 56% for all students, they also have much higher rates of further study demonstrating the demands of employers in science-related fields for graduates with higher level qualifications such as PhDs and Masters.

Chemistry and physics graduates in particular have higher levels of further study, outstripping the national average by around 20%, they also have extraordinarily high numbers of graduates who opt for extended study at PhD level; two thirds of graduates opt to do so compared to the national average of 12%. This reflects the opportunities for research and development in these fields and the support provided by the Higher Education Funding Councils across the UK for such research<sup>6</sup>.

## What kind of employment is pursued by science graduates?

The websites of the Royal Society for Chemistry, the Royal Society of Biology and the Institute for Physics all include careers sections that demonstrate the range of careers open to graduates of these disciplines<sup>7</sup>. For example, chemistry offers opportunities in science education, energy production, the environment, the research and development of household products and

pharmaceuticals, biomedicine and quality assurance. It is therefore worth noting that only a relatively small percentage of science graduates become science professionals. Chemistry leads the way with nearly 19% of its graduates working as science professionals, followed by biology and physics, with fewer than 8% respectively. Broadly, this may very well be related to wider changes in science-related industry in the UK<sup>8</sup>.

Although certain scientific giants such as GlaxoSmithKline and Pfizer remain, much research and development is taking place in small and medium enterprises (SMEs), which do not have the ability to recruit and train graduates in the same way as that being offered by, for example, the major accountancy firms.

Many science graduates start their careers as other associated professionals or science technicians; this is the choice of over 14% across the disciplines with the exception of physics, which is slightly lower at 8.5%.

There is also an oddity to be found in the very high percentage of graduates who become business and finance professionals instead of pursuing a career in science. Nearly 20% of all physicists choose this option as do 15% of chemists and 14% of graduates from the physical and geographical sciences. This is indicative of the correlation between the skills developed while studying science and the skills required for success in business related sectors.

As one might expect, large numbers of sports scientists (over 20%) become sports coaches or fitness instructors and over 12% of chemistry graduates secure employment in chemistry related roles. Beyond these expected outcomes there are significant numbers of graduates from each discipline who become business and marketing professionals, finance and investment analysts, management consultants, teachers and IT specialists.

A recent government paper<sup>9</sup> suggests that more can be done to embed careers advice and the development of work-ready skills among graduates in their science curricula, and that students themselves should take more responsibility for engaging at an early stage with their own career paths. The report

indicated that greater engagement through the curriculum and through contact with careers services in universities may lead to an even wider range of employment for science graduates and minimise both un- and under-employment<sup>10</sup>.

### Unemployment

Given that there is a nationwide need for students with good science skills to populate research and development in the future, why do this year's statistics show higher levels of unemployment amongst science graduates than graduates as a whole?

The recently published Wakeham report suggests that there are several key factors for both un- and under-employment among science graduates. Employers are less concerned about where and what a graduate studied and much more concerned about their lack of soft skills, business awareness and industrial experience<sup>11</sup>. Not only are graduates lacking skills such as the ability to give presentations, manage projects, write reports and work in teams, but there are particular concerns about a lack of maths skills and most notably, a lack of adaptability and resilience<sup>12</sup>.

The report points out that resilience in particular is vital while working in the interdisciplinary teams that are so common in these fields, as well as the need for an appreciation of profit motives, business planning and understanding clients' needs. Science students cannot change the face of industry but they can and ought to attempt to understand things like converging technologies, the growing diminution of natural resources, big data and the digitalisation of production. They also need to develop the soft skills outlined above while at university, which might enhance their employability when they come to graduate.

### Gender divide

The gender divide continues to be a topic of some interest in science subjects. Physical and geographical sciences have the most evenly balanced gender split, followed by chemistry, but biological sciences show a predominance of women graduates while physics and sports science are heavily predominated by male graduates (2:1 male: female ratio in sports science and around 4:1 in physics).

A government report in 2014, 'Women in Scientific Careers', points out the pressing need for more personnel in science careers and by definition, more women.

It acknowledges the efforts expended by government to encourage more girls to study science at school which seem to be bearing fruit, but also points out that should women choose to pursue careers in pure science, these careers are still not compatible with family life and childrearing should women wish to combine the two.

The report focuses on academic careers but it should be noted that many women also make up the large numbers who go on to work in business, finance, marketing, sales and education where a work-life balance may be easier to maintain.

There continue to be organisations working very deliberately to increase the profile of women working in science<sup>13</sup> and thus the take up at university level, with the overall aim of increasing the number of women working in STEM positions in the UK by one million. Athena Swan awards<sup>14</sup> are changing the landscape of opportunities for women in science research and one would expect to see a growing impetus for change in future years.

### Salaries

The salary range provided by respondents to the destinations survey is understandably broad across the disciplines. There are some disciplines where a high percentage of graduates have not yet established professional careers and perhaps are continuing the typical jobs students do such as bar work or retail (this accounts for 18.2% of biology graduates) – therefore, the salaries are a little lower than other sciences but still range from £17,000 to £21,600.

For subjects such as chemistry, where 76.3% obtain work in a professional or managerial role such as financial advisers or chemists, the salary range is a little higher at £18,400 to £25,600. Physics graduates are overall the best paid with salaries ranging from £17,700 to £28,400, reflecting the high numbers who enter employment as IT professionals or business, HR and finance professionals.

Salary information should only be used, however, as a very rough guide to outcomes. The destinations survey is conducted only six months after graduation when graduates are often in lower paid positions with a view to gaining the experience they require to progress in their chosen career. For example, physical and geographical graduates may take positions as ecological surveyors or countryside rangers, which are not as well paid as becoming a graduate accountant but

will stand them in good stead if they then wish to become an environmental consultant.

### The future

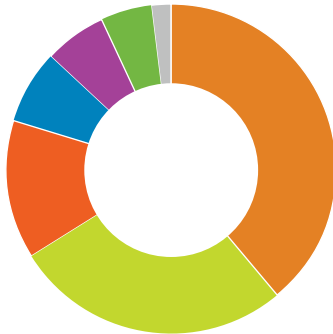
While demand for science graduates remains high, the prospects are good for those who choose to study science at university level. Although there are challenges in encouraging more women to study subjects such as physics and sports science, and having studied to then remain in pure science fields<sup>15</sup> there is a far broader challenge for universities, careers staff and the students themselves to ensure engagement in early career planning, skills development and employment awareness.

This will put science graduates in a position to take advantage of the very wide range of opportunities open to them at the end of their undergraduate study.

See references & resources on page 50

# BIOLOGY GRADUATES FROM 2015

**SURVEY RESPONSE: 81.4% | FEMALE: 2,480 | MALE: 1,705 | TOTAL RESPONSES: 4,185 | ALL GRADUATES: 5,140**



## OUTCOMES SIX MONTHS AFTER GRADUATION

Working full time in the UK	39.0%
In further study, training or research	27.2%
Working part time in the UK	13.6%
Unemployed, including those due to start work	7.2%
Other	6.1%
Working and studying	4.9%
Working overseas	1.9%

### TYPE OF COURSE FOR THOSE IN FURTHER STUDY

Masters (e.g. MA, MSc) 50.5%  
 Doctorate (e.g. PhD, DPhil, MPhil) 22.0%  
 Postgraduate qualification in education 12.3%  
 Other study, training or research 10.6%  
 Other postgraduate diplomas 4.1%  
 Professional qualification 0.5%  
 Total number of graduates in further study 1,140

### EXAMPLES OF COURSES STUDIED

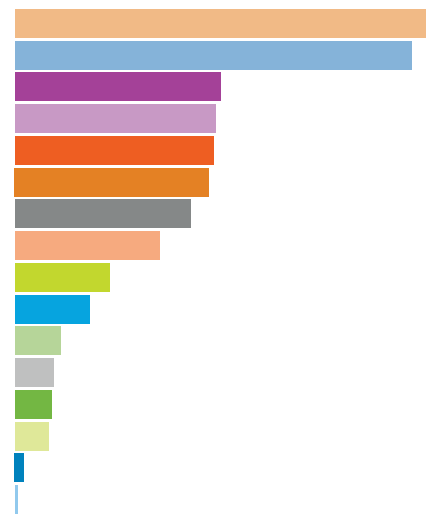
MSc International Health Policy  
 MSc Ecology, Evolution and Conservation  
 MSc Forensic Science  
 MSc Pharmacology  
 MBChB  
 PhD Genome Stability  
 PhD Cancer Research  
 PGCE Primary  
 PGDE Science  
 BA Professional Studies in Tax  
 PGDip Physician's Assistant

## TYPE OF WORK FOR THOSE IN EMPLOYMENT

Graduates who were in employment either full time, part time or working and studying in the UK

**FEMALE: 1,455 | MALE: 950 | TOTAL IN EMPLOYMENT IN THE UK: 2,405**

Retail, catering, waiting and bar staff	18.2%
Other professionals, associate professionals and technicians	17.6%
Business, HR and finance professionals	9.1%
Numerical clerk, clerical and secretarial occupations	8.9%
Other occupations	8.8%
Childcare, health and education occupations	8.6%
Science professionals	7.8%
Marketing, PR and sales professionals	6.4%
Education professionals	4.2%
Managers	3.3%
Health professionals	2.0%
Arts, design and media professionals	1.7%
Information technology (IT) professionals	1.6%
Legal, social and welfare professionals	1.5%
Engineering and building professionals	0.4%
Unknown occupations	0.1%

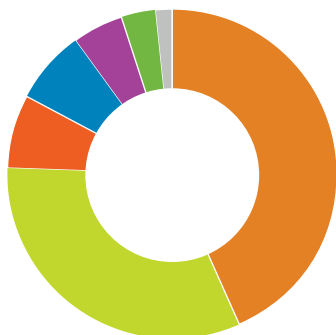


### EXAMPLES OF 2015 BIOLOGY GRADUATE JOB TITLES AND EMPLOYERS (SIX MONTHS AFTER GRADUATION)

Trainee manager - Aldi	Research officer - national park	Waiter - Pizza Express
Royal naval officer - Royal Navy	Science technician - water company	Sales assistant - Moshulu
Biology teacher - secondary school	Apprentice brewer - brewery	Chalet host - ski company
Fraud operations agent - Paypal	Ecological surveyor - Thomsons	
Tax associate - PwC	Civil Service fast stream - Civil Service	
Analyst - Morgan Stanley	Healthcare assistant - NHS	
Accountant - EY	Medical sales rep - pharmaceutical company	
Sales executive - Diageo	Administrator - environmental agency	
Marketing assistant - higher education		

## CHEMISTRY GRADUATES FROM 2015

SURVEY RESPONSE: 84.2% | FEMALE: 1,295 | MALE: 1,805 | TOTAL RESPONSES: 3,095 | ALL GRADUATES: 3,680



## OUTCOMES SIX MONTHS AFTER GRADUATION

Working full time in the UK	43.5%
In further study, training or research	32.1%
Working part time in the UK	7.4%
Unemployed, including those due to start work	7.1%
Other	5.0%
Working and studying	3.5%
Working overseas	1.4%

## TYPE OF COURSE FOR THOSE IN FURTHER STUDY

Doctorate (e.g. PhD, DPhil, MPhil)	60.3%
Masters (e.g. MA, MSc)	19.3%
Postgraduate qualification in education	12.6%
Other study, training or research	4.4%
Other postgraduate diplomas	2.9%
Professional qualification	0.6%
Total number of graduates in further study	995

## EXAMPLES OF COURSES STUDIED

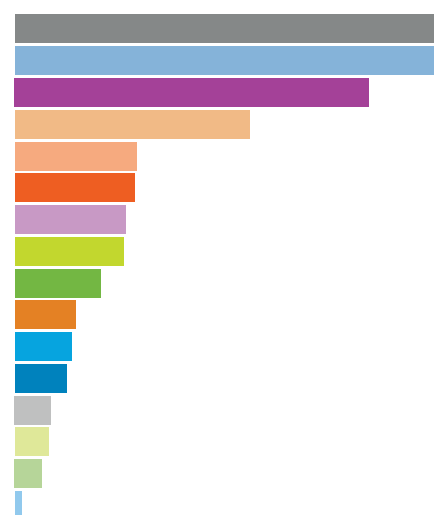
MSc Medicinal Chemistry	PhD Chemistry
MSc Polymer, Colour and Fine Chemicals	PhD Materials Science and Metallurgy
MSc Science and Technology Policy	PGDE Secondary

## TYPE OF WORK FOR THOSE IN EMPLOYMENT

Graduates who were in employment either full time, part time or working and studying in the UK

FEMALE: 730 | MALE: 950 | TOTAL IN EMPLOYMENT IN THE UK: 1,680

Science professionals	18.9%
Other professionals, associate professionals and technicians	18.6%
Business, HR and finance professionals	15.7%
Retail, catering, waiting and bar staff	10.4%
Marketing, PR and sales professionals	5.4%
Other occupations	5.3%
Clerical, secretarial and numerical clerks	4.9%
Education professionals	4.8%
Information technology (IT) professionals	3.8%
Childcare, health and education occupations	2.7%
Managers	2.5%
Engineering and building professionals	2.3%
Arts, design and media professionals	1.6%
Legal, social and welfare professionals	1.5%
Health professionals	1.2%
Unknown occupations	0.3%

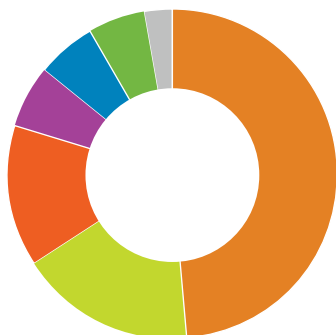


## EXAMPLES OF 2015 CHEMISTRY GRADUATE JOB TITLES AND EMPLOYERS (SIX MONTHS AFTER GRADUATION)

Supply chain manager - KPMG	Risk analyst - J.P. Morgan	Bookseller - Waterstones
Teacher - Teach First	Junior consultant - PwC	Bar staff - football club
Chemical analyst - ALMAC	Trader - Deutsche Bank	Carbon management assistant - higher education
Graduate scientist - AstraZeneca	Publishing assistant - publishing house	Carpenter's assistant - scenery production company
Research scientist - Lhasa Ltd	Exhibitions intern - art gallery	
Nuclear engineer - EDF	Chorister - cathedral choir	
Software engineer	Ministry trainee - Church of England	
	Civil Service fast stream - Foreign and Commonwealth Office	

# PHYSICAL AND GEOGRAPHICAL SCIENCES GRADUATES FROM 2015

**SURVEY RESPONSE: 82.2% | FEMALE: 1,295 | MALE: 1,425 | TOTAL RESPONSES: 2,720 | ALL GRADUATES: 3,310**



## OUTCOMES SIX MONTHS AFTER GRADUATION

Working full time in the UK	48.9%
In further study, training or research	17.1%
Working part time in the UK	14.0%
Other	6.1%
Unemployed, including those due to start work	5.8%
Working and studying	5.6%
Working overseas	2.6%

### TYPE OF COURSE FOR THOSE IN FURTHER STUDY

Masters (e.g. MA, MSc) 61.0%  
 Postgraduate qualification in education 21.4%  
 Doctorate (e.g. PhD, DPhil, MPhil) 6.9%  
 Other study, training or research 5.3%  
 Other postgraduate diplomas 4.0%  
 Professional qualification 1.5%  
 Total number of graduates in further study 465

### EXAMPLES OF COURSES STUDIED

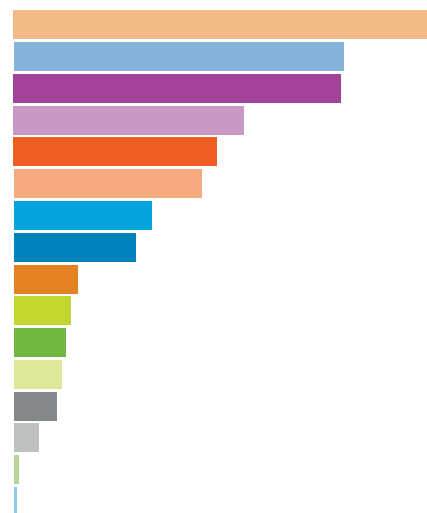
MSc River Basin Dynamics	MA Music and Sonic Media
MSc Energy and the Environment	PhD Environmental Engineering
MSc Meteorology	PGCE Teach First
MSc Global Urban Justice	PGDE Secondary
MSc Property	HNC Music
MSc Micropaleontology	

## TYPE OF WORK FOR THOSE IN EMPLOYMENT

Graduates who were in employment either full time, part time or working and studying in the UK

**FEMALE: 870 | MALE: 985 | TOTAL IN EMPLOYMENT IN THE UK: 1,855**

Retail, catering, waiting and bar staff	18.8%
Other professionals, associate professionals and technicians	14.6%
Business, HR and finance professionals	14.5%
Clerical, secretarial and numerical occupations	10.2%
Other occupations	9.0%
Marketing, PR and sales professionals	8.3%
Managers	6.1%
Engineering and building professionals	5.4%
Childcare, health and education occupations	2.8%
Education professionals	2.5%
Information technology professionals	2.3%
Legal, social and welfare professionals	2.1%
Science professionals	1.9%
Arts, design and media professionals	1.1%
Health professionals	0.2%
Unknown occupations	0.1%

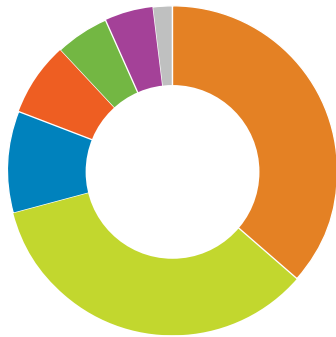


### EXAMPLES OF 2015 PHYSICAL AND GEOGRAPHICAL GRADUATE JOB TITLES AND EMPLOYERS (SIX MONTHS AFTER GRADUATION)

<ul style="list-style-type: none"> <li>Recycling manager - council</li> <li>Ecologist - JCA</li> <li>Hydrometry assistant - environmental agency</li> <li>Hydraulic modeller - Mott McDonald</li> <li>Software support - investment company</li> </ul>	<ul style="list-style-type: none"> <li>Commercial analyst - Morrisons</li> <li>Graduate trainee - Lloyds Bank</li> <li>Investment manager - Smith and Williamson</li> <li>Marketing graduate - Fujitsu</li> <li>Choir director - university</li> <li>Events producer - events company</li> </ul>	<ul style="list-style-type: none"> <li>Outdoor instructor - field centre</li> <li>Countryside warden - council</li> <li>Church intern - independent church</li> <li>Barista - Starbucks</li> <li>Sales assistant - Cotswolds</li> </ul>
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# PHYSICS GRADUATES FROM 2015

SURVEY RESPONSE: 83.8% | FEMALE: 535 | MALE: 2,080 | TOTAL RESPONSES: 2,615 | ALL GRADUATES: 3,120



## OUTCOMES SIX MONTHS AFTER GRADUATION

Working full time in the UK	36.6%
In further study, training or research	34.5%
Unemployed, including those due to start work	9.9%
Working part time in the UK	7.3%
Working and studying	5.1%
Other	4.9%
Working overseas	1.7%

### TYPE OF COURSE FOR THOSE IN FURTHER STUDY

Doctorate (e.g. PhD, DPhil, MPhil) 60.6%  
 Masters (e.g. MA, MSc) 24.3%  
 Postgraduate qualification in education 10.2%  
 Other study, training or research 3.1%  
 Other postgraduate diplomas 1.7%  
 Professional qualification 0.2%  
 Total number of graduates in further study 900

### EXAMPLES OF COURSES STUDIED

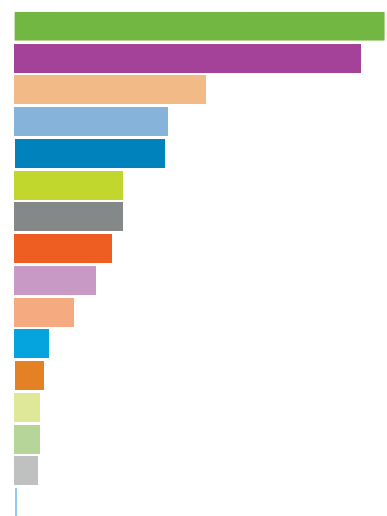
PhD Engineering  
 PhD Condensed Matter  
 MSc Automotive Engineering  
 MSc Tribology  
 MSc Diagnostic Imaging  
 MSc Particle Physics  
 MSc Cosmology  
 PGCE Science  
 PGDE Maths  
 GDL Law

## TYPE OF WORK FOR THOSE IN EMPLOYMENT

Graduates who were in employment either full time, part time or working and studying in the UK

FEMALE: 270 | MALE: 1,010 | TOTAL IN EMPLOYMENT IN THE UK: 1,280

Information technology professionals	20.5%
Business, HR and finance professionals	19.2%
Retail, catering, waiting and bar staff	10.6%
Other professionals, associate professionals and technicians	8.5%
Engineering and building professionals	8.3%
Education professionals	6.0%
Science professionals	6.0%
Other occupations	5.4%
Clerical, secretarial and numerical clerks	4.5%
Marketing, PR and sales professionals	3.3%
Managers	1.9%
Childcare, health and education occupations	1.6%
Legal, social and welfare professionals	1.5%
Health professionals	1.4%
Arts, design and media professionals	1.3%
Unknown occupations	0.1%



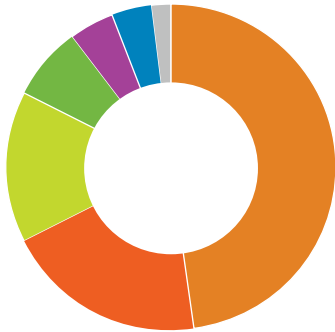
### EXAMPLES OF 2015 PHYSICS GRADUATE JOB TITLES AND EMPLOYERS (SIX MONTHS AFTER GRADUATION)

Physics teacher	Trainee - Barclays Bank	Product control analyst - Centrica
Planner - Transport for London	Analyst - EY	Patent attorney - Boulton Wade
Graduate engineer - building company	Product manager - manufacturing company	Ski resort worker
Network developer - BAE		
Software engineer - Thales		
Innovation analyst - intellectual property company		



# SPORTS SCIENCE GRADUATES FROM 2015

**SURVEY RESPONSE: 77.8% | FEMALE: 2,495 | MALE: 4,895 | TOTAL RESPONSES: 7,390 | ALL GRADUATES: 9,505**



## OUTCOMES SIX MONTHS AFTER GRADUATION

Working full time in the UK	46.3%
Working part time in the UK	19.3%
In further study, training or research	17.4%
Working and studying	7.1%
Other	4.3%
Unemployed, including those due to start work	3.8%
Working overseas	1.7%

### TYPE OF COURSE FOR THOSE IN FURTHER STUDY

- Masters (e.g. MA, MSc) 40.7%
- Postgraduate qualification in education 40.1%
- Other postgraduate diplomas 7.2%
- Other study, training or research 7.0%
- Doctorate (e.g. PhD, DPhil, MPhil) 4.1%
- Professional qualification 0.9%
- Total number of graduates in further study 1,290

### EXAMPLES OF COURSES STUDIED

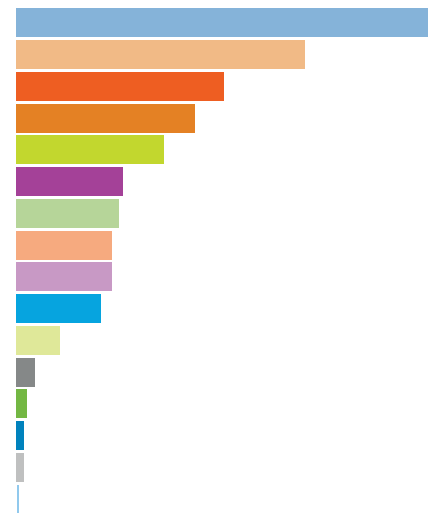
- MSc Biomedical Sciences
- MSc Sports, Business and Management
- MSc Physiotherapy
- MSc Biomechanics
- MSc Biological Sciences
- MA Sports Coaching
- MA Journalism
- PGDE Physical Education
- PGCE Primary
- BSc Physiotherapy

## TYPE OF WORK FOR THOSE IN EMPLOYMENT

Graduates who were in employment either full time, part time or working and studying in the UK

**FEMALE: 1,755 | MALE: 3,620 | TOTAL IN EMPLOYMENT IN THE UK: 5,370**

Other professionals, associate professionals and technicians	22.8%
Retail, catering, waiting and bar staff	16.0%
Other occupations	11.5%
Childcare, health and education occupations	9.9%
Education professionals	8.2%
Business, HR and finance professionals	5.9%
Health professionals	5.7%
Marketing, PR and sales professionals	5.3%
Clerical, secretarial and numerical clerks	5.3%
Managers	4.7%
Legal, social and welfare professionals	2.4%
Science professionals	1.0%
Information technology professionals	0.6%
Engineering and building professionals	0.4%
Arts, design and media professionals	0.4%
Unknown occupations	0.1%



### EXAMPLES OF 2015 SPORTS SCIENCE GRADUATE JOB TITLES AND EMPLOYERS (SIX MONTHS AFTER GRADUATION)

- |                                       |                                       |                                       |
|---------------------------------------|---------------------------------------|---------------------------------------|
| Physiotherapist assistant - NHS       | Web designer - self employed          | Medical claims assistant - legal firm |
| Pre-registration pharmacist - NHS     | Trainee accountant - council          | Sales assistant - Morrisons           |
| Sports therapist - football club      | Estate agent                          | Barista - Starbucks                   |
| Teacher - Teach First                 | Journalist - sports magazine          | Tour manager - sports travel company  |
| P.E teacher - secondary school        | Sports camps coordinator              | Driver - chemical company             |
| Youth worker - lads' club             | Fitness instructor - Army             | Kitchen builder - Howdens             |
| Support worker - council              | Teaching assistant - secondary school |                                       |
| Residential welfare officer - charity |                                       |                                       |