



Institute of Physics In Scotland

Physics statistics in Scotland

Schools

There were 376 Secondary Schools in Scotland in 2008 according to the Scottish Government School Estate Statistics 2008.

Pupils

HIGHER, 2001 TO 2008

ALL CANDIDATES

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | PERCENT CHANGE 2006/2007 |
|---------|--------|-------|-------|-------|-------|-------|-------|-------|--------------------------------|
| Physics | 10,015 | 9,580 | 9,489 | 9,286 | 8,952 | 8,617 | 8,580 | 8,762 | +2% |

ENTRIES AND AWARDS FOR EACH SUBJECT AT HIGHER BY GENDER, 2006

| Physics | ENTRIES | AS % OF ALL CAN DS | GRADE | | | | PASSES | D |
|-------------------|---------|--------------------------------|-------|-------|-------|-------|--------|---|
| | | | A | B | C | D | | |
| MALE CANDIDATES | 6,196 | 72% | 1,716 | 1,468 | 1,309 | 4,493 | 555 | |
| FEMALE CANDIDATES | 2,421 | 28% | 796 | 615 | 597 | 1,928 | 175 | |

ENTRIES AND AWARDS FOR EACH SUBJECT AT HIGHER BY GENDER, 2006

ALL CANDIDATES

| SUBJECT | TOTAL ENTRIES | PERCENTAGE OF ENTRIES | | PERCENTAGE OF GRADE A | | PERCENTAGE PASS RATE | |
|---------|------------------|--------------------------|--------|--------------------------|--------|-------------------------|--------|
| | | MALE | FEMALE | MALE | FEMALE | MALE | FEMALE |
| Physics | 8,617 | 72 | 28 | 28 | 33 | 73 | 80 |

STANDARD GRADE, 2001 TO 2006

ALL CANDIDATES

| SUBJECT | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | PERCENT CHANGE 2005/2006 |
|---------|--------|--------|--------|--------|--------|--------|--------------------------------|
| Physics | 19,272 | 19,678 | 19,136 | 18,170 | 16,917 | 17,064 | 1% |

ENTRIES AND AWARDS BY GENDER FOR EACH SUBJECT AT STANDARD GRADE, 2006

| SUBJECT - Physics | ENTRIES | AS % OF ALL CANDS | GRADE | | | | | | |
|-------------------|---------|-------------------------|-------|-------|-------|-------|-----|-----|----|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| MALE CANDIDATES | 12,328 | 72% | 3,750 | 3,429 | 3,076 | 1,014 | 538 | 349 | 46 |
| FEMALE CANDIDATES | 4,736 | 28% | 1,825 | 1,336 | 968 | 244 | 192 | 114 | 14 |

TREND IN ENTRIES FOR EACH SUBJECT AT INTERMEDIATE 1, 2001 TO 2006

ALL CANDIDATES

| SUBJECT | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | PERCENT CHANGE 2005/2006 |
|---------|------|------|------|-------|-------|-------|--------------------------------|
| Physics | 147 | 282 | 769 | 1,073 | 1,555 | 1,845 | 19% |

ENTRIES AND AWARDS FOR EACH SUBJECT AT INTERMEDIATE 1 BY GENDER, 2006

| SUBJECT - Physics | ENTRIES | AS % OF ALL CANDS | GRADE | | | | D |
|-------------------|---------|-------------------------|-------|-----|-----|--------|-----|
| | | | A | B | C | PASSES | |
| MALE CANDIDATES | 1,558 | 84% | 323 | 318 | 340 | 981 | 109 |
| FEMALE CANDIDATES | 287 | 16% | 58 | 49 | 52 | 159 | 26 |

**TREND IN ENTRIES FOR EACH SUBJECT AT INTERMEDIATE 2,
2001 TO 2006**

ALL CANDIDATES

| SUBJECT | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | PERCENT CHANGE 2005/2006 |
|---------|-------|-------|-------|-------|-------|-------|--------------------------------|
| Physics | 1,849 | 1,882 | 2,065 | 2,240 | 2,354 | 2,645 | 12% |

**ENTRIES AND AWARDS FOR EACH SUBJECT AT INTERMEDIATE 2 BY
GENDER, 2006**

| SUBJECT - Physics | ENTRIES | AS % OF ALL CANDS | GRADE | | | | |
|-------------------|---------|-------------------------|-------|-----|-----|--------|-----|
| | | | A | B | C | PASSES | D |
| MALE CANDIDATES | 1,892 | 72% | 382 | 243 | 416 | 1,041 | 227 |
| FEMALE CANDIDATES | 753 | 28% | 265 | 122 | 138 | 525 | 63 |

**TREND IN ENTRIES FOR EACH SUBJECT AT ADVANCED
HIGHER, 2001 TO 2006**

ALL CANDIDATES

| SUBJECT | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | PERCENT CHANGE 2005/2006 |
|---------|-------|-------|-------|-------|-------|-------|--------------------------------|
| Physics | 1,026 | 1,378 | 1,414 | 1,414 | 1,426 | 1,437 | 1% |

**ENTRIES AND AWARDS FOR EACH SUBJECT AT ADVANCED
HIGHER BY GENDER, 2006**

| SUBJECT - Physics | ENTRIES | AS % OF ALL CANDS | GRADE | | | | |
|-------------------|---------|----------------------------|-------|-----|-----|--------|----|
| | | | A | B | C | PASSES | D |
| MALE CANDIDATES | 1,124 | 78% | 354 | 283 | 222 | 859 | 80 |
| FEMALE CANDIDATES | 313 | 22% | 117 | 85 | 58 | 260 | 17 |

Source: Scottish Qualifications Authority Annual Statistical Report and Digest 2006.

Total qualifications attained by leavers at SCQF level 3 to 5, by subject and gender: 2008/09

| | SCQF Level 5 | | SCQF Level 4 | | SCQF Level 3 | | SCQF Levels 3 to 5 | |
|-------------|--------------|--------|--------------|--------|--------------|--------|--------------------|------------------|
| | Male | Female | Male | Female | Male | Female | All | % of all leavers |
| Mathematics | 7,542 | 7,993 | 10,290 | 9,951 | 8,158 | 7,874 | 51,808 | 94.0 |
| Biology | 3,621 | 7,676 | 3,180 | 6,168 | 1,525 | 2,865 | 25,035 | 45.4 |
| Chemistry | 5,646 | 5,770 | 3,902 | 3,700 | 1,243 | 1,223 | 21,484 | 39.0 |
| Physics | 6,278 | 2,798 | 4,081 | 1,124 | 1,495 | 402 | 16,178 | 29.4 |

Total qualifications attained by leavers at SCQF level 6, by subject, grade and gender: 2008/09

| | Male | | | Female | | | All Passes | |
|-------------|-------|-------|-------|--------|-------|-------|------------|------------------|
| | A | B | C | A | B | C | All | % of all leavers |
| Mathematics | 2,032 | 2,099 | 1,603 | 1,761 | 2,002 | 1,727 | 11,224 | 20.4 |
| Chemistry | 1,170 | 1,023 | 923 | 993 | 973 | 910 | 5,992 | 10.9 |
| Physics | 1,468 | 1,408 | 1,009 | 618 | 516 | 418 | 5,437 | 9.9 |
| Biology | 569 | 629 | 596 | 1,016 | 1,248 | 1,197 | 5,255 | 9.5 |

Total qualifications attained by leavers at SCQF level 7, by subject, grade and gender: 2008/09

| | Male | | | Female | | | All Passes | |
|-------------|------|-----|-----|--------|-----|-----|------------|------------------|
| | A | B | C | A | B | C | All | % of all leavers |
| Mathematics | 334 | 312 | 381 | 243 | 263 | 269 | 1,802 | 3.3 |
| Chemistry | 212 | 243 | 222 | 220 | 224 | 241 | 1,362 | 2.5 |
| Biology | 94 | 137 | 165 | 188 | 264 | 313 | 1,161 | 2.1 |
| Physics | 308 | 254 | 228 | 95 | 62 | 53 | 1,000 | 1.8 |

Source: SQA Attainment and School Leaver Qualifications in Scotland: 2008/09

Physics Teachers

Secondary school teachers by main subject taught and gender 2006-2009

| | 2006 total | 2007 total | 2008 total | Main subject taught 2009 | | | including where the subject is not the main subject | | |
|---------------------|------------|------------|------------|--------------------------|-------|--------|---|--------|--------|
| | | | | female | male | total | female | male | total |
| All subjects | 24,427 | 24,895 | 24,418 | 14,685 | 9,040 | 23,724 | 20,999 | 12,521 | 33,519 |
| Physics | 936 | 906 | 887 | 235 | 629 | 865 | 269 | 681 | 950 |

Secondary school teachers by main subject taught and age, 2009

| | Under 25 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60 or over | average |
|---------------------|----------|-------|-------|-------|-------|-------|-------|-------|------------|---------|
| All subjects | 1,106 | 3,268 | 2,812 | 2,477 | 2,373 | 3,974 | 4,152 | 3,730 | 833 | 43 |
| Physics | 34 | 93 | 108 | 92 | 118 | 145 | 127 | 152 | 39 | 43 |

Students graduating from teacher training by subject, 1999-2008

| | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Total | 1,784 | 1,969 | 1,968 | 2,367 | 2,060 | 2,285 | 2,849 | 3,906 | 3,755 | 3,100 |
| Physics | 30 | 28 | 28 | 42 | 46 | 51 | 58 | 92 | 65 | 40 |

Source: Teachers in Scotland, 2009; Scottish Government

Advertised vacancies by sector and subject

| | Number of vacancies | | | | | | | % of full complement |
|----------------|---------------------|------|------|------|------|------|------|----------------------|
| | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | |
| Physics | 12 | 19 | 16 | 25 | 9 | 10 | 5 | 0.6 |

Posts vacant for more than 3 months by sector and subject

| | Number of vacancies | | | | | | | % of full complement |
|----------------|---------------------|------|------|------|------|------|------|----------------------|
| | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | |
| Physics | 6 | 3 | 7 | 11 | 1 | 3 | 2 | 0.2 |

Source: Teacher Vacancies and Probationer Allocations 2008; Scottish Executive

The Institute of Physics provides support for these teachers through an Education Manager, 7 Regional network co-ordinators. There is also a Resources website and an

email network. The Institute of Physics also supports the Stirling physics teachers' meeting, which attracts more than 200 physics teachers each year and a summer school, which has an average of around 25 teachers. Approximately 10 training days around Scotland are held each year, attracting around 250 teachers in total.

Higher Education

Average funding per science student, at £7,580, is higher than the £6,326 in England (source: Scottish Executive 2006). Average funding per science student in 2007-8 is £7,830. (Source: Scottish Funding Council:

http://www.sfc.ac.uk/information/info_circulars/sfc/2007/sfc1607/Table%20A1.xls)

The number of student enrolments and number of Scottish Higher Education Institutions offering degrees in physics in each academic year since 1994-95:

| Academic Year | Total Enrolments | Number of Higher Education Institutions Offering Degrees |
|---------------|------------------|--|
| 1994-95 | 1,970 | 12 |
| 1995-96 | 1,920 | 12 |
| 1996-97 | 1,890 | 12 |
| 1997-98 | 1,890 | 13 |
| 1998-99 | 1,865 | 13 |
| 1999-2000 | 1,815 | 12 |
| 2000-01 | 1,705 | 12 |
| 2001-02 | 1,660 | 12 |
| 2002-03 | 1,585 | 11 |
| 2003-04 | 1,630 | 9 |
| 2004-05 | 1,545 | 9 |

Source: Higher Education Statistics Agency.

The data above includes all students on first degree or postgraduate degree courses in physics.

The number of higher education institutes (HEI) offering a particular course has been determined as the number of HEIs teaching one or more students in the subject in the given year. The number of institutions offering these subjects fluctuated during the reporting period as did the total number of HEIs in Scotland: in 2001-02 Bell College and UHIMI have become higher education institutions.

**Physics graduates from Scottish Higher Education Institutions
1999-2000 to 2003-04**

| Academic Year | Total | Postgraduate | First degree | Other HE |
|---------------|-------|--------------|--------------|----------|
| Physics | | | | |
| 1999-2000 | 365 | 65 | 295 | 5 |
| 2000-01 | 380 | 65 | 310 | 5 |
| 2001-02 | 310 | 70 | 245 | 0 |
| 2002-03 | 325 | 70 | 245 | 10 |
| 2003-04 | 330 | 60 | 260 | 10 |

Source: Higher Education Statistics Agency (HESA).

The number of undergraduate degree places accepted by students domiciled in Scotland, wishing to study physics at Scottish universities were:

(a) 198 in 2004-05, (b) 181 in 2005-06, (c) 214 in 2006-07 (d) 231 in 2007-08.

Source: Written Parliamentary Question S3W-5707

The number of undergraduate degree places accepted by students wishing to study physics at Scottish universities were:

(a) 265 in 2004-05, (b) 247 in 2005-06, (c) 318 in 2006-07 (d) 332 in 2007-08.

Source: Written Parliamentary Question S3W-5706

Scottish Universities Physics Alliance (SUPA)

SUPA has approximately 20 Chairs and Lecturers, 14 SUPA Research Fellowships, and 8 competitive studentships per year, a Chief Executive, and a Director of the new Scottish Graduate School in Physics.

Graduate Destinations

- Science graduates are more likely, compared to graduates from other subjects, to enter into managerial and professional roles (47% of science graduates, compared to 42% of other graduates), or associate professional and technical roles (35% of science graduates, compared to 30% of other graduates), occupations; and
- Science graduates are considerably more likely, compared to all graduates, to be in permanent employment in Health and Social Work six months after graduation (49% of science graduates in permanent employment, compared to 32% of all graduates).

Source: Supply of, and demand for, science graduates in Scotland, Scottish Executive, Scottish Funding Council and Futureskills Scotland.

Research in Science in Scotland

Scotland captures 1% of world citations with 0.1% of its population. We are ranked second in the world behind only Switzerland and ahead of the USA in terms of impact of the research we produce. Impact is measured as the average number of citations per paper, and this has been increasing progressively over the last ten years.

Our best performing research fields, in terms of impact, are clinical sciences (2nd in the world), health and related sciences (1st), and biological sciences (3rd). Other strongly performing subjects are physical sciences and mathematics.

Source: Scottish Government, research base metrics 2007

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Physics in the Scottish Economy

- In 2005 there were around 102,000 employee jobs in Scotland in sectors where the use of physics based technologies or expertise was critical to the existence of the sector. This is equivalent to 4.3 per cent of all jobs in Scotland and ten per cent of jobs in physics based sectors in the United Kingdom.
- The decline in the number of jobs in physics based sectors in Scotland mirrors the trend in falling employment in physics based sectors in the United Kingdom.
- In 2005 levels of gross value added of the physics based sectors were around £8 billion – making up 9.4 per cent of the Scottish economic output.
- Productivity levels in physics based sectors in Scotland in 2005 were almost twice as large as the United Kingdom average

Source: Physics in the Scottish Economy report, Institute of Physics.

Electronics

- More than 1000 companies involved in designing, developing, and supplying electronic products and/or services are located in Scotland.
- Over 45,000 people are employed directly and approximately 29,000 indirectly.
- Electronics contributes 14 per cent to Scotland's GDP.
- Scottish universities have a higher Research Assessment Exercise rating per capita than the rest of the UK.
- The supply base is recognised globally for its ability to meet the demands of blue chip companies.
- Scotland makes 28 per cent of Europe's PCs; more than seven per cent of the world's PCs; and 29 per cent of Europe's notebooks.
- Electronics accounts for 12 per cent of Scotland's total manufacturing employment and for more than half of Scottish exports.
- Biggest export products are PCs and peripherals such as printers.

Optoelectronics

- 4,200 employed
- £800 Million turnover
- 65% exported.
- Scotland accounts for 34% of UK Government spend in optoelectronics research (with only 10% of the UK's population).

Microelectronics

2,300 employed in semiconductor fabrication, 1,000 in electronics design and a further 1,800 in supply and support industries.

Source: Scottish Enterprise

Institute of Physics in Scotland Outreach

The Institute of Physics in Scotland awards grants for outreach purposes. Approximately 2000 children and adults had contact with one of our funded lectures, workshops or exhibitions.

Alison McLure
National Officer (Scotland)
Institute of Physics
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