

THIS RESPONSE WAS SUBMITTED AT
<http://interactive.dius.gov.uk/scienceandsociety/site/>
ON 17 OCTOBER 2008 BY CAROLINE DAVIS ON BEHALF OF THE
LONDON MATHEMATICAL SOCIETY AND THE INSTITUTE OF
MATHEMATICS AND ITS APPLICATIONS.

Consultation documents can also be seen at the above web address.

1 of 5: The vision for Science and Society

Q. How should we measure progress? What indicators do we need to measure success?

The LMS and IMA look forward to the day when people value rather than fear mathematics. In his review of primary school mathematics teaching, Sir Peter Williams wrote that the UK is one of the few advanced nations where it is “socially acceptable - fashionable even - to profess an inability to cope with the subject”. For the mathematics community, success will be when this is no longer true.

2 of 5: A society excited by and valuing science

Q. How can scientists further improve and professionalise engagement with the public?

The mathematics community is proud to have Professor Marcus du Sautoy who has been successful in raising the profile of mathematics and mathematicians. He is an EPSRC senior media fellow, which means that he can focus on media work alongside his research. To have more such envoys for mathematics and science could only be beneficial.

We also need to promote a culture where engagement with the public is valued by academics and their institutions. This could be facilitated by funding streams that allow researchers to buy out some of their time to concentrate on engagement activities without feeling it will compromise their career progression.

Q. How should high quality engagement be recognised and rewarded?

This year, the London Mathematical Society and the Institute of Mathematics and its Applications are launching the Christopher Zeeman medal, which will for the first time recognise excellence in the promotion of mathematics.

Smaller awards or competitions run by, for example, the research councils could also encourage participation by a wider range of individuals.

Continuation under the Research Excellence Framework of recognition for activity in this area, as in the RAE, should be considered as a positive contributory factor to a healthy research environment.

Q. How can the scientific and policy communities make science more interesting for the public and particularly for those difficult to reach groups?

We need to think of new places to talk about science and mathematics. For example, Steve Humble specialises in outdoor mathematics, running local 'Maths trails' around cities in the north-east of England, a 'Maths in the Malls' event at the Gateshead Metro shopping centre and writing a 'Dr Maths' column for his local newspaper where readers write in with a question, perhaps about something their child has learnt at school.

During Maths Year 2000, there was a very successful series of maths posters designed especially for London Underground trains.

There is scope for running campaigns in public places such as supermarkets, shops and banks, or working with industry, such as food manufacturers, to display small mathematics or science facts on their products.

Q. What contribution can science centres make to the science and society agenda?

The London Mathematical Society and the Institute of Mathematics and its Applications have established the Mathematics Promotion Unit to act as a point where participants can engage with mathematics, complementing the STEM agenda.

Q. How can the media better support society's need for balanced information that accurately portrays the nature of science and improves scientific literacy?

Free and very easy to access media training should be offered to the press on a regular basis. This should involve basic training in the scientific issues which are current, but also a grounding in the use of statistics and mathematics in reporting as well as the scientific method and explanations of the caution and provisos with which academics present their work.

Risk in particular and the mathematics behind it should also be explained. It is vital that members of the press understand this area and support should be offered to all journalists.

It is up to the mathematics and science community proactively to ensure it supplies the media with suitable material to write about.

Q. How can the lack of quantity and breadth of science television on terrestrial and other channels be addressed?

Ofcom states that public service broadcasters must support, amongst other genres, programming in science. A closer relationship between the science community (in its widest sense) and Ofcom could help to ensure this is properly upheld.

We have been pleased to see Marcus du Sautoy's new series, "The Story of Maths" broadcast by BBC4 and look forward to seeing it repeated on either BBC1 or BBC2 in the near future.

Q. How can business better engage with society and policy makers about the development and use of science in everyday life?

The **more maths grads** project, funded by Hefce, has had significant success engaging employers who employ staff with mathematical science backgrounds. They have invited such companies to take part in their activities with schools, and, working together have created careers materials based on interviews with the employers and employees

Building these contacts and involving them in our outreach activities is beneficial not only to those attending the activity, but also inform businesses of the challenge faced by those trying to stress the value of mathematics and science.

A system of government grants or tax reliefs to interest and reward businesses for instigating such activity could help to kickstart this, hopefully embedding it into employers' cultures.

3 of 5: A society that feels confident in the use of science

Q. What more can the science community and the media do to foster a shared understanding of the nature of science?

The LMS and IMA would like to see much clearer explanations of the use of statistics and the mathematics of risk when used to report science.

Q. How can we develop the scientific literacy of the science, policy and public communities?

The quality of mathematics and science teaching at school can make a huge difference to those children's attitudes to the subjects when they are adults. A recent Ofsted report, *Mathematics - understanding the score* wrote that only half of mathematics lessons evaluated were 'good' or 'better', with the rest at best 'satisfactory'. It also warned that too much mathematics teaching was aimed at getting children to pass examinations.

If teachers are not given sufficient freedom in their classroom teaching, their lessons will not help develop mathematical literacy, nor generate the enthusiasm and curiosity which enables them to grow into mathematically confident and engaged adults. A poor grasp of mathematics is a major cause of underachievement and disengagement with the other sciences.

It is also important that the measure of successful teaching goes beyond achieving high scores in narrowly focussed tests.

Q. What more can the business community do to foster public confidence in science in industry?

Transparency of how mathematics and science are used in industry are key. We have heard mathematicians blamed for the recent problems in Wall Street and the City, suggesting that their mathematically complicated trading instruments were ultimately to blame. It is vital that the public understand, or can access information about, how mathematics is used by financial institutions.

Q. What additional mechanisms should be put in place to enable policy makers to better interact with scientists?

Where research is harnessed to provide policy advice and development this should be recognised in the assessment of research environment under the REF as it is under the RAE.

Schemes equivalent to the EPSRC media fellowships in policy advising should be available, or funded sabbaticals which would enable mathematicians to work in policy environment for a short time to experience and inform what goes on.

4 of 5: A society that supports a representative well-qualified scientific workforce

Q. What more do schools need to enhance the science curriculum to make it more exciting and relevant?

The recent Ofsted report criticised mathematics teaching for concentrating too much on helping students to pass examinations. More freedom in the classroom would enable teachers to communicate what they find exciting about mathematics, and to think about what would interest their particular class of students. A benign rather than punitive inspection regime which encouraged enrichment and extension activity would be beneficial.

Q. What can the science and business communities do to tell young people about the career opportunities that a science education opens up in all work areas?

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such companies to take part in their activities with schools, and, working together have created careers materials based on interviews with the employers and employees

The www.mathscareers.org.uk website has also had success in informing young people of the opportunities available to those with a mathematics background.

We also welcome the FutureMorph careers website created by the Science Council, which complements mathscareers.org.uk and is working closely with it.

Q. Is there a different way to teach science subjects which could help overcome the issue of under-representation of some groups?

The **more maths grads** project has been exploring the effects of direct intervention with schools in areas identified to have high proportions of certain groups which are under-represented in the mathematics community.

The Further Mathematics Network has built a network across the UK to ensure that all students who wish to study for Further Mathematics A-level have access to teaching. This is done either through students visiting other colleges for tuition or through involving a local university to provide tuition or online or even postal tuition. This model has proved successful in increasing uptake and could be modified to ensure good quality teaching in all subjects is available to all pupils.

The Royal Institution runs Mathematics Masterclasses also across the UK. This involves children attending a series of weekend workshops covering subjects designed to enthuse students on subjects often not approached on school syllabuses. Again, this model could be modified to reach children of different ages in different subjects.