

Learning to Love Science: Harnessing children's scientific imagination

A report from The Chemical Industry Education Centre, University of York
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Foreword from James Smith

Why is Shell committed to supporting science education?



Shell is committed to supporting science education because science holds the key to helping us understand the everyday world around us.

Science also has a key role to play in our economic future, and in helping to solve some of the most pressing challenges we face in the world today - including meeting growing energy demand in sustainable ways. A lack of skilled workers to drive the STEM industries forward could risk the loss of innovation and participation in this area by UK companies.

Expert leaders from the Shell Education Service visit over 50,000 primary school children each year, running unique, interactive, physical science workshops. They also organise family science days with local communities and support trainee primary science teachers, building their confidence and skills in teaching science.

We know that children are naturally excited by science through our work with the Shell Education Service. We want to encourage the movement of that childlike enthralment to serious consideration of a career in science in more and more of our children.

We commissioned the *Learning to Love Science: harnessing children's scientific imagination* report to learn what might cause children

to disengage from science and what is needed to maintain their interest. I hope it gives insight into how we can better communicate the diverse nature of science careers.

The research shows us that children as young as nine are already considering their future direction. This underlines the importance of engaging children with science early and we must ensure that, once children are excited by the world of science, we harness this early enthusiasm.

Industry has a role to play. Creating better links with schools to enable children to see science in action helps companies of all sizes - from the local to the international.

A handwritten signature in black ink that reads "James Smith". The signature is written in a cursive, flowing style.

James Smith
Chairman, Shell UK

Executive summary

Science, technology, engineering and mathematics (STEM) industries are of strategic importance to the future development of the UK economy.

This report explores school students' attitudes to science to establish why many disengage with the subject and what can be done to reverse this trend. It examines when and why pupils "switch off" from science and the extent to which the UK is missing out on a potential pool of scientists as a result.

The report builds on the wealth of previous research in this area and includes new, previously unpublished, research commissioned by Shell Education Service and conducted by specialist youth research company, Dubit. During the summer term, 2008, a poll of 4,000 children aged 9-14 was carried out by Dubit and 27 interviews with students, teachers, graduates and employers were conducted by the Chemical Industry Education Centre at the University of York.

This report captures this work to bring fresh perspective on one of the biggest educational challenges facing the UK today. A skilled workforce is essential in achieving the aim of a high technology, high value-added economy. But the numbers of school students choosing to take physical sciences post-16 has fallen over the last 25 years.

Shell research shows that, as young as nine years old, over half of those polled had a firm idea about their future occupation. Over a quarter (28%) said they would study and work in science in the future. This

proportion remained relatively stable over the age range questioned. However, responses in the poll and analysis of existing examinations data, suggest that a large number of students who could potentially follow a science-related career are rejecting this option by the time they reach the age of 16.

Those students surveyed, who had rejected science as future option, said that they did not want to sit in a laboratory all day or that they found science boring. It must be a major concern that many students do not have a good sense of what is involved in science-related jobs. The challenge therefore is to engage and inspire these students so that science becomes a viable choice that they reconsider.

Many existing studies and the new Shell research, indicate a decline in positive attitudes towards science as children progress through secondary school. Children at 14 years old see less relevance of science to the real world, find it less inspiring, enjoy less practical work and feel they have less opportunity to use their imagination in science than children at nine years old.

Despite this decline in positive attitudes to science at secondary school, a study by the Organisation for Economic Co-operation and Development (OECD) reported that the performance of students in science in UK secondary schools was well above the international average, although it also noted a spread of abilities in the UK with a considerable

number of low-achieving students. There is a challenge, therefore, to ensure that the teaching of science meets the needs of all levels.

There does not appear to be just one single reason for the fall in popularity of the physical sciences but reasons include:

- a curriculum that is often perceived by students as being too theoretical and not relevant
- a poor understanding of the options offered by science-based careers in both students and some teachers
- a shortage of specialist science teachers, especially of physics in secondary schools

These issues have been recognised and are being addressed.

The science curricula have been modified to promote opportunities for seeing science in a real life context. Programmes to recruit, retain and train teachers with a physics specialism are ongoing. Many companies are actively involved in promoting links with education and a national programme to promote STEM subjects has been initiated.

This report reviews the reasons why students 'turn off' from science. It explores some of the approaches which can inspire children with science and ensure we develop the rich source of skilled scientists so vital to the future development of this country.

Shell Social Investment

Science | Education | Innovation | Creativity

Shell's approach to Social Investment goes beyond our commitment to corporate social responsibility, which is embedded in the way we carry out our day-to-day business. We also want to make a wider contribution to the future of UK society. Our Social Investment programmes focus on core themes - science, education, innovation and creativity. We believe these will play a central role in the UK's ability to meet many of the most pressing challenges facing society, not least in meeting growing energy demand in sustainable ways.

SHELL EDUCATION SERVICE



Established by Shell more than 50 years ago, SES delivers fun, interactive, investigative science workshops to over 50,000 primary school children every year. In addition, fun family science days and teacher training days aim to encourage and inspire young children to explore and question science.

To find out more, please visit: www.shell.co.uk/ses

SHELL SPRINGBOARD



Shell Springboard gives a financial boost to innovative, commercially viable business ideas that tackle climate change. The programme encourages a positive business response to the challenge of climate change by providing a no-strings financial boost to small business with innovative products and services that could help reduce greenhouse gas emissions and really make a difference. For more information, please see: www.shellspringboard.org

SHELL STEP



Shell Step helps young people develop business skills and move from the world of study to the world of work. The programme provides summer work placements with small companies to more than 600 students each year. Students gain highly relevant and meaningful business experience which makes significant impacts on companies' bottom line.

To find out more, please see: www.step.org.uk

SHELL LIVEWIRE



The programme enables young entrepreneurs to access free online tools, information and advice as well as providing the opportunity to join a global network of people just like them, who understand the challenges they face. Created over 25 years ago, the programme has become a highly valued and well-used source of insight and advice, which has been extended to a further 22 countries. To learn more, please go to: www.shell-livewire.org

COMMUNITY RELATIONS



Employee engagement is at the heart of what we do and we have a wide selection of volunteer programmes which allow staff to become involved in their local community. Shell invests, supports and champions community initiatives throughout the UK, especially in those areas close to our sites - at Aberdeen, Bacton (Norfolk), Chester, Ellesmere Port, Glasgow, Mossmorran and Braefoot Bay (Fife), St Fergus (Aberdeenshire), South London (Lambeth & Southwark) and Wythenshawe.

SPONSORSHIPS

Inspiring creative thinking is fundamental to Shell's success as an energy company. We think it's important to encourage creative thinking and intellectual curiosity in all areas of society. That's why we support some of the country's most inspiring organisations, including: Science Museum, Rotunda Museum, Natural History Museum, Southbank Centre, Geological Society and National Theatre.

For further information, please see our website: www.shell.co.uk/socialinvestment

