

Helping the next generation of teachers to get children enthused about science through fieldwork

A briefing note for Parliamentarians

The Problem in a Nutshell

Over a number of years, The Field Studies Council's work has led us to believe that fieldwork is a great way to increase student's enthusiasm for science and help them on their way to becoming the new scientists of the future. However, unfortunately we have found that there are a number of barriers to improving fieldwork. In particular, we have specifically identified that Initial Teacher Training (ITT) is not working effectively enough to help produce high quality teachers who can meet the modern day challenges of teaching the next generation of children and young people.

The Scale of the Problem –Skills Gap in Science Based Industries

Science, technology, engineering and mathematics (STEM) industries are of strategic importance to the UK contributing over £68 billion a year to the economy and accounting for over a third of all UK exports. A skilled workforce is essential in achieving the aim of a high technology and high value-added economy. Yet, the number of school students choosing to take physical science post-16 has fallen over the last 25 years¹. Research recently published by Shell revealed that only 28% of those students electing to study science after the age of 16 intended to study science and pursue a scientific career. This suggests that the UK is missing out on a pool of potentially thousands of new scientists as a result of school students not pursuing the subjects, even if they have an interest.

By 2014, it is expected that the UK will need to fill over three-quarters of a million extra jobs requiring highly numerate, analytical people with STEM skills. Yet, recent surveys have suggested that six out of ten companies employing STEM-skilled staff say they are having difficulty recruiting, and the low take-up of STEM subjects at university is a large part of the problem. Employers are forced to look abroad to hire STEM graduates with a third of larger firms recruiting from India and 24% from China. Unless the decline in the study of STEM subjects is halted, Britain will struggle to compete in the global market. Without an urgent increase in the number of skilled STEM workers, there will be a loss of innovation and participation by UK companies in this area.

The Challenge

Despite this decline in science uptake, a recent 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. Yet many studies have indicated a major decline in positive attitudes from students towards science. Children at secondary school generally see less relevance in science to the real world, find it less inspiring, enjoy less practical work and feel they have less opportunity to use their imagination. Students are 'turning off' science and more work is needed to ensure that students are inspired and to enable the UK to develop a rich source of skilled scientists so vital to the future of the British economy.

Whilst there is no single reason for the fall in popularity of physical sciences it is clear that students need to be engaged in the subject to a greater level. Hands-on practical science is known to stimulate and inspire and effectively-planned and well-taught fieldwork is a particularly powerful approach. It can help to define life choices. However, in order to give children a chance to be enthused by science through fieldwork – there is a need to first equip teachers with the ability to do so.

It is clear that the quantity and quality of fieldwork training and development within ITT is highly variable, and is weakened generally by the absence of any agreement of what constitutes the minimum fieldwork training and development requirement needed to train secondary science teachers. It is clear that the poor quality of teaching resources and the inadequacy of training for ITT Tutors are hindering the progress of new teachers.

¹ Learning to Love Science: Harnessing Children's Scientific Imagination, 2008

Current Provision of Fieldwork

Fieldwork provision in science and biology is declining in British secondary schools. More than 96% of GCSE science pupils will not experience a residential field trip, while nearly half of all A-level biology students will do no field work, with the possible exception of half a day's experience near their school². Similar trends at all key stages and extending to universities appear to be leading to a shortfall in people with the practical skills needed to support biodiversity-related careers and activities. Fieldwork provision is declining in our schools despite the very clear educational and personal development strengths that it offers.

The Government currently holds limited evidence on how best to prepare teachers for fieldwork. For example in a recent answer to a Parliamentary Question the Parliamentary Under Secretary of State for Schools and Learners, Sarah McCarthy-Fry MP, stated that: "the Department [for Children, Schools and Families] has made no assessment of whether the encouragement of fieldwork as a teaching method is adequately supported by teacher training courses³". We are concerned that the Government has not assessed the status of fieldwork within ITT and feel that without this assessment there is limited chance of positive changes being made. Recently published evidence, collected with the help of the FSC, has shown that a significant minority of secondary science ITT providers offer no training in fieldwork⁴.

The Solution

There is evidence that good quality residential fieldwork and outdoor learning helps to improve education standards⁵. In order to ensure the future of we would specifically like to see the Government introduce minimum standards in ITT.

Specifically, the government must ensure that each trainee teacher:

1. Attend, and have an active role, in a school visit as part of their training.
2. Plan and lead a one lesson with pupils outside the classroom as part of their training.
3. Receives at least 4 hours of training in out of classroom learning as part of their ITT.

Background to the FSC

The FSC was established in 1943 as a educational charity committed to bringing environmental understanding to all. It has become internationally respected for its 17 education centres with over 100,000 visitors a year attending day and residential courses. This makes us the UK's leading provider of field courses. The FSC provides informative and enjoyable opportunities for people of all ages and abilities to discover, explore, be inspired by, and understand the natural environment. We believe that the more we know about the environment, the more we can appreciate its needs and protect its diversity and beauty for future generations.

Summary and Conclusions

We believe that if the recommendations contained in the briefing were adopted by the Government it would build knowledge, skills and confidence to a level whereby newly-qualified teachers would feel able to lead practical activities outside the classroom or laboratory, and make full use of the subject pedagogy associated with the effective teaching of science.

We are committed towards trying to contribute to the Government's policy goals of increasing the uptake of STEM students. As a result, we would greatly appreciate your support in communicating these issues to the Government and the responsible Minister. If you would be willing to assist us and require any further information, please contact Dr Steve Tilling, Field Studies Council by email: steve@field-studies-council.org.

² School Science Review, 2003

³ House of Commons Hansard Written Answers, 22 January 2009

⁴ School Science Review 2009

⁵ National Foundation for Educational Research, 2004