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Learning from watching the world change

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Why do we need environmental education?

To meet the many challenges of environmental change, and to develop more sustainable ways of living, we need an informed public. If humanity is the root cause of many of today's environmental problems, changing human behaviour is a necessary solution. Education, is clearly important, and this is recognised by the UK government: 'Education for sustainable development' is a key theme of the revised National Curriculum for schools in England and Wales.

Environmental education is challenging because different people interpret 'environment' in different ways. Environmental education must also draw from a range of disciplines, geography, biology, chemistry and social sciences to name a few.

Real-world teaching

Environmental educators need to choose their source material carefully. There are plenty of 'facts', figures and claims concerning environmental issues, some of them more trustworthy than others. Scientists therefore have a valuable role to play in education, and increasingly, scientific organisations are undertaking education activities, under the banner of *public understanding of science*. Long-term monitoring programmes are particularly useful because they can also guarantee continuity of good quality, regularly updated data and information.

The UK Environmental Change Network

The UK Environmental Change Network (ECN) is the UK's long-term, integrated environmental monitoring and research programme. ECN gathers information about the pressures on and responses to environmental change in physical, chemical and biological systems. It is supported by a consortium of 14 sponsoring organisations and 9 research organisations and is co-ordinated by the Centre for Ecology and Hydrology.

It was recognised from the outset that ECN could provide data relevant to issues such as climate change, air and water pollution, land use change and biodiversity loss, for researchers, policy-makers and educators. From an early stage, data have been made available on the ECN web site, and *bona fide* users may freely use data by applying for a data use licence.



Computers are increasingly commonplace in the classroom

What can ECN provide for environmental education?

ECN is primarily a research network; however there are many other applications for the data that ECN collects, including its obvious educational potential. Teachers and students can get access to the raw data, under licence, by applying to its Central Co-ordination Unit. But increasingly ECN is producing data products on its Internet site as a way of allowing people access to the data.

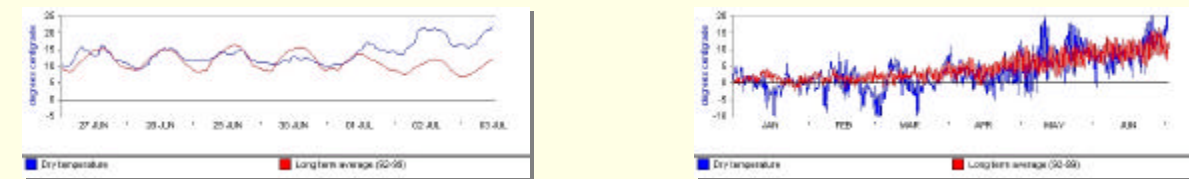
ECN is keen to exploit the educational potential of its data and its Internet site has recently become part of the National Grid for Learning (<http://www.ngfl.gov.uk>), the UK's focal point for learning on the Internet.

ECN Data Products on the Internet: raw material for education

Some of ECN's data products have an immediate value as a source of educational material. The ECN summary database is accessible from the web site (www.ecn.ac.uk) from which users can view summary data (in graphical and tabular form) for most of ECN's measurements. The data can also be downloaded via email so that users can explore and manipulate the data for themselves.



Each of ECN's terrestrial sites has an Automatic Weather Station (AWS) installed for continuous meteorological recording. ECN has designed an application that can automatically retrieve data from some of these and display the data directly on the web site, allowing users to view the current weather conditions around the UK. It is hoped that links to most of the ECN AWS's will be established in due course, so students should be able to view data from reasonably close to their schools.



The online weather data can be viewed in conjunction with the ECN site photo archive. Digital photographs are taken each week at many ECN sites to create a permanent visual record of the conditions at the sites. The growing archive of images can be used to look at changing conditions at the sites in relation to the weather.



ECN has developed weather and climate tutorials for GCSE students. These explore key meteorological concepts, as well as the factors affecting climate change. The tutorials were designed to be informative, attractive to the eye and simple to follow. In the tutorials, students are encouraged to relate the topics they are learning to real-life situations. A combination of ECN data, synoptic charts, digital photographs and links to other sources of information and data on the Internet are used as teaching aids.



Other data products on the ECN web site include climate change indicator pages that provide site-level data to aid interpretation of the UK's national indicators and an interface to the ECN publications database providing a rapid means of searching for literature on ECN sites and research.

Towards targeted education products

In order to develop effective teaching outputs, it is necessary to work with people from the education sector. As a first step towards developing closer contacts with these groups, we hosted an open meeting, *Teaching Environmental Change 2000* (TEC2000), aimed at bringing together scientists, teachers, other educational professionals, IT professionals and others with an interest in environmental education.

The aim of TEC2000 was to promote the use of information from environmental research and monitoring organisations for teaching about environmental change. Particular attention was given to the use and development of computer-based tools to deliver material that complements other teaching methods.

Talks outlined where environmental change education fits within teaching curricula and the potential role of research organisations in teaching.

TEC2000 was sponsored by the Natural Environment Research Council (NERC) with support from the Royal Society, who hosted the meeting. The event attracted over 100 people. The TEC2000 web site is www.nmw.ac.uk/tec2000.



Helen Young of the BBC Weather Centre, guest speaker at TEC2000



A recent article on ECN education initiatives, in NERC News

Future Developments

The ECN web site has received a number of awards for its education content. However, we recognise that there are improvements to be made. Therefore, we are aiming:

- To develop contacts in schools, colleges and other education establishments
- To work with end-users to improve and expand our range of online education products
- To ensure that our education products are appropriate to UK education curricula.

ECN is currently exploring the possibility of working with an Internet-based artist ('net artist') to promote awareness of its work in relation to climate change, and to develop related educational products.

For more information about any aspect of the UK Environmental Change Network, please contact:

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The following research organisations undertake ECN monitoring: Agricultural Development Advisory Service, Drayton; Chemical and Biological Defence, Porton; Centre for Ecology and Hydrology; Forest Research, Alice Holt; Freshwater Fisheries Laboratory, Pitlochry; Institute of Grassland and Environmental Research, North Wyke; Institute of Arable Crops Research, Rothamsted; Macaulay Land Use Research Institute; Environmental Change Research Centre, University College London.