

TSN News

Increased Support for TSN

The TSN could not have continued without the financial and moral support of the Gatsby Charitable Foundation. Now well into our second year the foundation has taken a good look at us, apparently likes what it sees, and has agreed to increase support for another two years. Not only that, it would like to see us encouraging and supporting new TSNs in other parts of the country.

It has also agreed to help us with several other proposals. Here are some of the things we hope to do in the near future:

- *'Master Classes'* for teachers of science who would like to bring themselves up-to-date with the latest scientific developments—in, for example, biotechnology, global warming or genetic engineering. The first part of the day would be a series of talks given by science experts in their field. Then after lunch, there would be some 'hands on' practical activity related to the morning. Apart from a registration fee, all other costs including supply cover for teachers will be met by the TSN. Teachers outside the TSN will also be able to apply.
- *Travel expenses for scientists* when

Continued on page 2

Top Down or Bottom up? _____	2
Science Museum stereotype _____	2
Problem solving for a 4 yr old _____	3
Science Education Standards _____	3
bbsrc Workshop _____	4
SET 96 _____	4
New TSN Members _____	4
Redundant Equipment _____	4

Amy's Fantastic Day

16 year old Amy Howarth, a year 11 student at Stalham High School, describes a rather special science day...

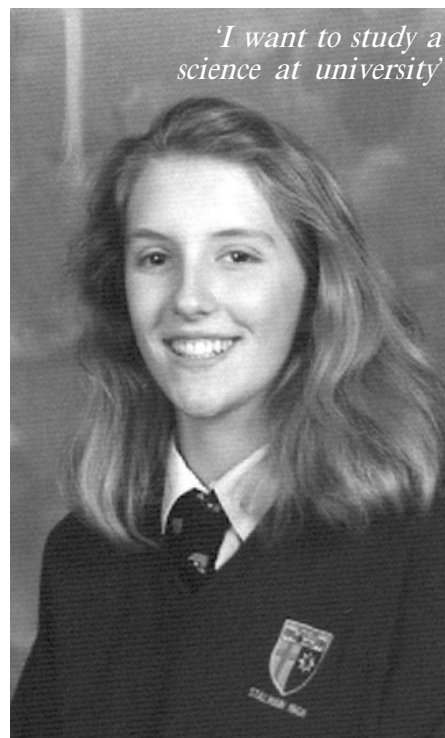
'I spent an exciting, interesting day working alongside Dr. Kay Yeoman, a research scientist in the School of Biological Sciences at the UEA. The visit was organised by one of my science teachers at school, he has Dr. Yeoman as his 'Science Partner'. My teacher spends part of his week working in the School of Education so he was able to take me into the University and then take me into the Biology Laboratory to meet Dr. Yeoman.

I spent the first part of the morning being shown around the labs, I met all the members of the research team and was given an explanation as to what everyone was doing. I went back to Dr. Yeoman's lab where the task for my day was explained, this was the preparation of some DNA. It is possible to remove small sections of DNA from the plasmid of a cell using certain enzymes. We were then able to clone this and produce some DNA of our own. At this point we made some cultures and I was shown how to make different types of Agar jelly. This jelly was used so I could see the pattern of the DNA which I had cloned in some bacteria. We took a picture of the DNA with a

special computer. Although she had demonstrated the cloning of the DNA just for me it was a technique that is used a great deal in the research they are

doing, which is to try and get plants to produce their own nitrogen with the aid of certain bacteria.

It was a fantastic day, a day I certainly will remember for a long time. One of



the things that amazed me was the amount I understood, I thought that I wouldn't understand anything. Next year I am going to study Sciences at A level and then hopefully follow some form of science course at University. Thank you ever so much Dr. Yeoman for your time and Professor Johnston for allowing me to work in your Department. ♡

'One of the things that amazed me was the amount I understood.'

Top Down or Bottom Up?

Institutions often decide to contribute their ideas to science education by producing a package of curriculum material for teachers or children to use. Sadly, instead of becoming worn out by frequent use, these packages often gather dust, unused, on cupboard shelves. Many beautiful, glossy, professionally produced packages are used once and then put aside and forgotten. Why? Lots of reasons: they may be conceptually too difficult; or perhaps the language level is all wrong; or sometimes the message is too unbalanced and self-promoting. Often they require a disproportionate amount of time and effort for the tiny area of curriculum they actually cover.

Producers might avoid these problems if they were to involve teachers—who know what will work and what they need—early enough. The production has been *top down* rather than *bottom up*.

The TSN tried to get things right by involving teachers and scientists from the very beginning; teachers and scientists who were going to use the TSN were also its designers.

The ginger group that sprang from the weeks of consultation with teachers and scientists said what would be worthwhile and what they thought would work. The established Steering Group of teachers and scientists continues this practice by overseeing and guiding the TSN's actions.

From the beginning it was clear that partners wanted to work in different ways. Different scientist can offer different things; different teachers have different needs. New partnerships, before they begin, discuss and decide what it is they want to do. One partnership might focus upon helping to resource a particular school science activity, another by updating the teachers' science knowledge. A few have concentrated upon a special group of pupils, others have worked on enhancing a term's programme of science for a whole year group. Some have linked older children with the scientist's laboratory and research, and sometimes the partnership operates quite happily simply by providing background contact and occasionally needed information.

Because these made-to-measure partnerships are also designed *bottom up* (pardon the pun), they are more likely to succeed.

Original purpose of TSN

We never have formalised the aims at the TSN; the nearest we can get is the list of things the ginger group said was wanted, and what it thought the TSN could help do, i.e....

- enhance classroom science by bringing in fresh, up-to-date information and other resources from the science community;
- provide teachers with a professional science contact for information and advice;
- provide scientists with an insight into educational processes and purposes, and to give them the opportunity to become involved;
- provide children with role models and the conditions to dispel the 'boffin' stereotype;
- create a network of communication between the science community and the education community—including meetings to share experiences and ideas;
- produce materials and new ideas for investigations in the classroom;
- provide teachers with opportunities for first-hand experience in professional laboratories.

The next two years

Now we have new and increased funding for what is already in place, and extra funding for new developments, it might be time to think how the next phase should look. Perhaps we should ask ourselves questions like:

- *What are the purposes and aims of the TSN?*
- *What should we keep and develop?*
- *What should we jettison?*
- *What else might we do?*
- *The TSN is biased towards teachers' needs: what could it do for scientists?*

Soon the steering group members will begin to address these questions, but if we are to continue as we began, by involving practicing teachers and scientists, it is important that we know your views.

The Steering group really would value your opinions. What do you think? Do you think anything needs changing, or think something should be scrapped, or added? Please let us know—do write, phone, fax or Email your thoughts. (Address at bottom of page 4) ◇

Continued from page 1

visiting their partner's school—especially when the school is far away. (22p/mile)

- *Increased coordinator time.*
- *Workshops in education for scientists,* e.g. national curriculum, OFSTED, how children learn science, hints and tips on survival in school, etc.
- *TSN delegation to US.* This is to take place at the end of term. The aim is to learn from the experiences of networks that have been running there for some years. ◇

Science Museum should know better

Joanna Cheall
North Elmham Primary School

This picture is from the Science Museum's catalogue, it shows a 'mad scientist' child. Just the image TSN is trying to discourage. Disappointing I thought, especially coming from the Science Museum!



•••••
• **TSN Reminder**
• **Our Annual Meeting has**
• **ben re-scheduled for**
• **~4.30 pm at the John**
• **Innes Centre on**
• **18 April 1996.**
•••••

Problem-Solving from the start

Mobilising Teddy

A class of 4 and 5 year olds at Lodge Lane First School was given a science problem: to get their teddy-bear to move. They eventually decided upon (and successfully made) a wheeled cardboard trolley with a wind sail, but in the preceding brainstorming session to get ideas, 4 year old Charlotte made these suggestions.



1 Put him in a boat.



2 Put him in a hot air balloon

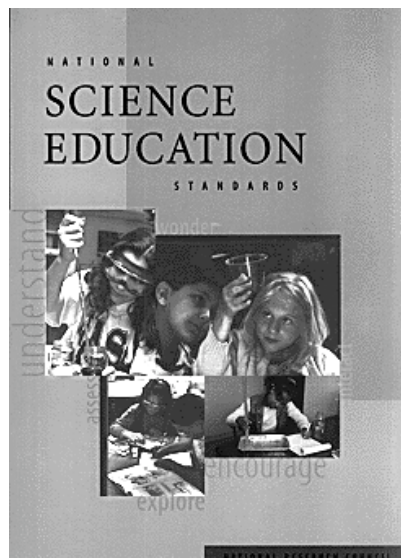


3 Put him in the washing machine!

What the United States gets, and what we lost

National Science Education Standards*

'In a world filled with the products of scientific enquiry, scientific literacy has become a necessity for everyone. Everyone needs to use scientific information to make choices that arise every day. Everyone needs to be able to engage intelligently in public discourse and debate about important issues that involve science and technology.'



So begins the introduction to one of the newest and most significant science education documents to be produced in the US.

The production of the *National Science Education Standards* took place in a climate of unprecedented collaborative review by teachers, scientists, school administrators and community groups. It is a document that promotes everything we once hoped for in our Science National Curriculum.

The most encouraging first stages in the development of our Science National Curriculum, even if unwieldy, did promote the purposes of science education in the way the ASE and many, many others had been doing since the late seventies; i.e. with an emphasis on the centrality of process and

context, a pruning and careful selection of content, and with a recognition of personal attributes such as attitudes and the ability to make informed value judgements. In other words viewing science education primarily as helping to prepare children for citizenship in a democratic society. Sadly much of this vision was lost in the politics surrounding the many revisions our science documents underwent. (Teachers will remember, for example, how 'scientific attitudes' suddenly changed to 'scientific aptitudes' in the next revision document. Political paymasters, it seems, are not happy to promote anything that encourages probing, and questioning long held assumptions.)

The *National Science Education Standards'* compilers seem to have been successful in keeping politics at bay. *Standards* is a set of guidelines offering a coherent vision of what it means to be scientifically literate. They not only describe what all students regardless of background or circumstance should understand and be able to do in science as a result of their learning experience, but they also describe standards for the following:

- Exemplary science teaching that enables students to develop scientific literacy.
- Standards for the professional development of teachers of science, including opportunities to update their knowledge and their teaching skills.
- Criteria for assessing students' attainments in science and for assessing the opportunities to learn. (e.g. the resources available).
- The nature and design of school and district science programs, including the provision of resources, and the appropriateness of the programme to the students' lives.
- The support and resources needed to provide all students with the opportunity to learn science.

The standards reflect three principles: learning science is an inquiry-based process, science in schools should reflect the intellectual traditions of contemporary science, and that all Americans have a role in science education.◇

* *National Academy Press, Washington DC 1996. ISBN 0-309-05326-9*

Working with Primary Schools: a bbsrc workshop

Carol Bennett
Lodge Lane First School

The bbsrc workshop was a forum for teachers and scientists, from all over the country, to meet and explore ways in which teachers and scientists could work together. It was good to meet so many people who are enthusiastic about science education and are willing to get involved. Mark Leech (my scientist partner) and I spoke about our own practical experiences of a partnership. However, for me, one of the most interesting aspects of the day happened during the car journey home when I said to Mark, "What do you really do?"

For the next hour or so he patiently explained to me what his job involves at the John Innes Centre. Occasionally he would forget that he was speaking to an infants' teacher and set off down a road of technical terms and scientific jargon. At such times I would say, "Woah!" and insist that he explained what he really meant to say.

By the time we got back to Norwich I knew that chromosomes are the equivalent of ten miles long, that it is possible to examine them in 'ten metre' strips and that he is hoping to move a gene which is resistant to a particular pest and put it into rice so that the rice will be resistant to that pest.

Inevitably this led us to discussing the ethics of such genetic engineering and the need for the general public to understand the issues involved so that we can all hold informed opinions on such matters. Decisions on such issues are usually made by an informed few, even though they may affect everyone. At the end of our conversation I certainly felt that I understood a great deal more—I even modified my views on the matter. However, and this is the important bit, this only came about because a scientist took the time and trouble to explain scientific research in a way in which I could understand and so enable me to make valid judgements.

Thank you Mark. This is one member of the general public who is now better informed.◇

Teacher Scientist Network

Coordinator: Frank Chennell Hurdle Cottage, Brisley Road, North Elmham, NR20 5DL. Telephone/fax 01362 668 337

New TSN Members

WELCOME

Mrs Sue Crawford-Condig, Headteacher, Kenninghall Primary School
Mrs Karina Love, Scientific Officer JIC
Mr Tony Bown, Hobart High School
Mr Ian Paton, Operation Analyst, Dow Chemicals
Mrs Margaret Findlay, Science Coordinator, Gaywood Junior School
Mrs Maxine Woods, Science Coordinator, Heacham Middle School
Prof Peter Richmond, Information Systems, UEA
Mrs Anne Jewers, Deputy Head, Mattishall First School
Mrs Anna Cullingford, Assist. Scientific Officer, JIC
Mrs Sue Graves, Acting Head, Gt Witchingham Primary School
Mrs Jan Peart, Head of Monoclonal Antibody Lab, JIC
Mr Chris Harries, Headteacher, Dereham Church First School
Dr Zelda Abraham, Post Doc Fellow JIC
Mr Andrew Sinclair, PhD Student, JIC
Dr Marcus Durrant, Research Scientist JIC
Mr Stuart Couthart, Science Coordinator, Cawston Primary School
Mrs Anne Clements, Headteacher, Little Melton First School
Dr Paul Nicholson, Project Leader, JIC
Mr Christopher Pitt, PhD Student, JIC
Mrs Patricia Lunness, Research Assistant, JIC
Mrs Jo Belsten, Research Scientist, JIC

More equipment to give away

From the Institute of Food Research.

- 5 BBC 64K computers (no monitors)
- 2 BBC Master computers (no monitors)
- 7 5.25 in. double disk drives for BBCs
- 1 12 in. mono monitor
- 2 Epson LQ 850 printers
- 1 Imagewriter
- 1 286 640K/47M computer with 12 in colour monitor
- 1 Analogue (mechanical) single pan analytical balance

Contact Frank Chennell

SET 96

National Science week March 15-22

Many schools are involving their scientist in something local during Science Week, but other events are also planned:

First Steps in Science

Castle Museum, 16-19 March. Tiny hands-on science for children aged 3-6.

SET Trail

Norfolk towns - to be announced. 15 - 20 March. Hands-on science for countryfolk, from UEA, the Institute of Food Research and local industry

Jack and the Gene Stalk?

Friends Meeting House Norwich 7.30 pm 21, 22 & 23 March. This will include interactive drama and discussion on the ethics of Genetic Engineering.

Inspire

Norwich hands-on Science Centre. Watch out for Marie Curie, Tim Hunkin, Exploding Custard, and a real live John Innes Scientist!

Shell Science Lecture Programme for Schools

Sponsored by Shell U.K. Exploration and Production, the first lecture (for 4-8 year olds) has gone, but the remaining programme is:

A visit from Sir Isaac Newton Peter Joyce (for 9-12 years) Friday 8th March 10.30 & 1.30 Lecture Theatre 1*

Do you smell what I smell? Dr Dave Mela The Institute of Food Research, Reading (for 10-13 years) Mon 18th March, 10.30 & 1.45 Lecture Theatre 1*
Fun and games with liquid air Dr. David Nicholls, University of Liverpool (for 12-15 years) Wed 20th March 1.30 only Lecture Theatre 1*

*Booking forms from Mrs Imelda Race, School of Chemical Sciences, UEA.◇