

Science Learning Centre for the East - not East enough!

In such a celebratory edition of TSNews we are sorry to report that our consortium bid was unsuccessful in its attempt to bring the East of England SLC centre to Norwich (TSNews No.17). After an extraordinary amount of hard work this was a bitter disappointment to all involved in the bid but a quote from DfES softened the blow slightly - *we (DfES) recognise the value of the TSN and would not want to lose this from the Network*. The centre was awarded to the University of Hertfordshire and we look forward to working with them to ensure teachers in Norfolk are well represented in this exciting development for science education across the East of England.

Save British Science

Save British Science (SBS) were so impressed when they heard about TSN that they intend to send this edition of TSNews to their members in the East of England. In a reciprocal arrangement we enclose a copy of their newsletter. So who or what are SBS? They are a pressure group, which aims to improve the scientific health of the UK. They work to support the research base, science in industry, scientific advice in government, and science education. They apply pressure directly to Government and industry through meetings with key decision-makers and also provide information and reports for the media, parliamentary committees, and other groups active in science policy. For an organisation of its size, SBS is remarkably successful at influencing the debate. If you wish to contribute to their research on science education, please send your contact details to: rosemary@savebritishscience.org.uk

You can find up-to-date information about their work in science education by visiting the 'Campaigns' section of the SBS website at www.savebritishscience.org.uk of course, should you wish to support SBS further they offer subscriptions.

www.cherrybyte.org

Is a website helping to develop an understanding and appreciation of agricultural and biological science. It uses everyday language to explain to the public the purpose, value and application of the research funded by the consortium partners, which includes the JIC - see enclosed flyer.

Teacher Scientist Network

Coordinator: *Dr. Phil Smith*

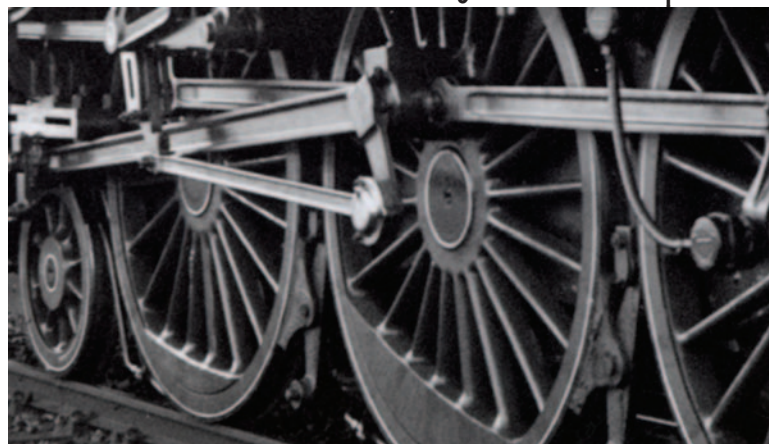
Chairman: *Prof. Keith Roberts*

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www.tsn.org.uk

RE-INVENTING THE WHEEL / my favourite experiment



I am sure many of us, teachers and scientists, have pet-experiments, demos or ideas that work particularly well to demonstrate a given topic. Share them with us!

As requested at the Annual Meeting last year, a section of the newsletter will be dedicated to these gems. If I am inundated with them - and that depends on YOU - the information will also appear on the website. They will remain anonymous if you wish but will encourage us all to share good practice. Please keep them brief, but they should include enough information for the the experiment to be carried out effectively for starters

Boil a red cabbage for 5 minutes in water and you have a natural indicator to test for acidity & alkalinity ... also offers artistic potential!



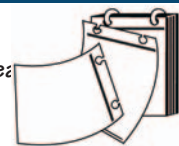
This scheme, run by the Royal Society, offers up to £2500 for teachers and scientists (or engineers) to work together on exciting and inspiring projects or activities involving students from 5 to 16 years old.

Projects should give young people the opportunity to meet and work with scientists on topics that are exciting, imaginative and relevant to their lives. Any UK teacher can apply for a Partnership Grant, and the grant is awarded directly to the school involved, enabling the school to pay for any specialist equipment needed for the investigation, travel expenses for the scientist/engineer and/or the school group and possibly teacher supply cover.

The next closing date for the scheme is October 22nd 2004. For more details on the scheme or to request an application pack, contact Laura Fenton on 020 7451 2561 or email laura.fenton@royalsoc.ac.uk

Dates for your diary

- * 5th Oct - TSN Annual Mtg inc. *bonanza glassware gives*
- * 12th Oct - *Biorad Biotechnology INSET / JIC*
- * 24th Oct - *Partnership Grant deadline (Royal Society)*



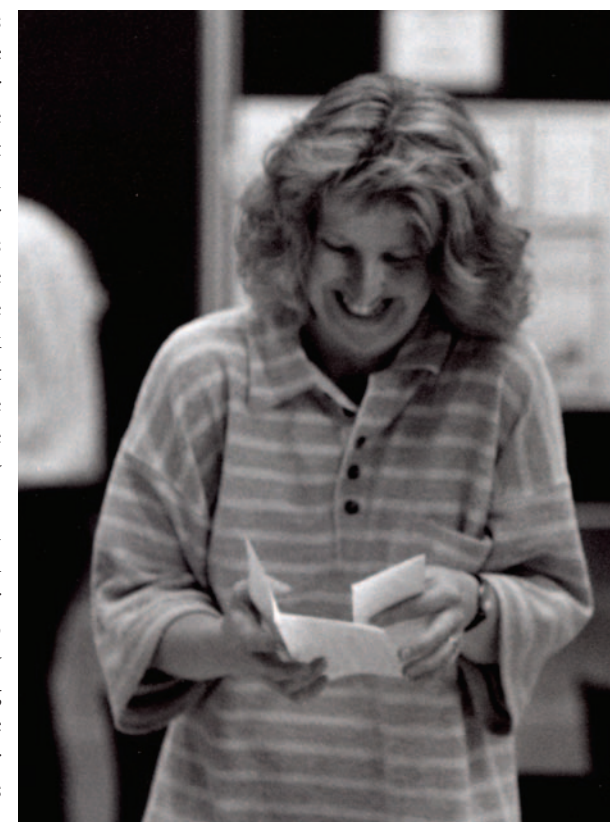
It all began in San Francisco ...

A scheme dreamed up by Bruce Alberts (now President of the National Academy of Sciences, USA) partnered teachers and scientists in San Francisco to work together in local elementary schools. Keith Roberts saw the scheme and got together with Frank Chennell to start something similar here in the Norfolk. So, after some consultations with teachers and scientists, we launched with...

Blind Date on the Norwich Research Park (1994)

In early summer 1994, a hundred teachers and scientists gathered at the John Innes Centre to hear Keith Roberts and Frank Chennell explain the scheme. Then the teachers and scientists met - for the very first time - their TSN partner. Each person was given a name badge for themselves and a card with the name of their (carefully chosen) partner along with instructions to find their partner. Over some refreshments they then had to introduce themselves, and make their first date in school. *Hence, TSN was launched.*

Some of you reading this today were members at the start; thank you for your help and support down the years. Did you realise that some of you have been working together with your partner for 10 years? This is testimony to your desire to help enhance science education across Norfolk - the TSN Mission - and it can provide a great source of motivation for more recent members in the 'early days' of their partnership. No two partnerships will work in the same way, and we are always keen to hear stories of your activities to share with others. Finally our thanks to our Steering Group for their guidance over the years, and for being our eyes and ears into the education world.



There was no Graham for a quick reminder at this Blind Date

TSN in 2004

Ten very successful years on, TSN goes from strength-to-strength providing more of what our members ask for - more **partnerships**. We now have over 70 partnerships across Norfolk (shown on the map across the centre-pages), and are always seeking new members. In 1997 came **MasterClasses** (our first, Climate Change), then **Primary Science Workshops** (2001) and then the **KitClub**. During this year's National Science Week, 29 of our 38 kits were on loan, and TSN went on tour. All these are described in this bumper edition of TSNews, itself in its 18th edition.

Planning is underway for a very special **Annual Meeting**, in October this year, which we hope will be attended by both new and existing members. We would like to encourage more secondary schools to be involved and particularly to think about using the KitClub, nearly all the kits can be used by all Key Stages - help us by talking to colleagues, and telling them about TSN.

Looking further ahead, the Norwich Research Park is hosting the annual **BA Festival of Science in September 2006**, an opportunity to raise the profile of science in the region, and engage and inspire our young people to share our passion for science. TSN will have a central role in this event which provides an ideal platform to champion our success to a national audience and provide events for teachers as well as their pupils.

TSN is looking forward to another 10 years, and we would also like to take this opportunity to thank our sponsors, the Gatsby Charitable Trust for all their support over the years.

10th Anniversary Edition 1994 - 2004

Plants are fun!

Dr Fiona Corke (JIC) and Mrs Marian Watt (Hethersett Middle)

As a plant scientist at JIC and keen gardener at home, plants seemed an ideal topic for us to cover with three Yr5 classes. The session was very much hands-on and incorporated a number of TSN kits and some unusual specimens. The children were fascinated by the collection of activities, and here's what we did ..



Food for Dinosaurs looked at and asked the pupils to draw giant horsetails, ginkgo and sporulating fern – fossil evidence shows that horsetails are the same species eaten by the dinosaurs. Available in Hethersett, they are 4-5ft tall – see above picture!

Carniverous Plants use a variety of different methods to trap insects – sticky leaves (sundews & butterworts), moving traps (Venus flytraps) and tube traps (pitcher plants)- all fascinating subjects for the children to look at and touch.

The 'sensitive Mimosa' in which the leaves droop when touched to avoid being eaten, grows well from seed and effectively demonstrates a 'moving plant'.

Using microscopes, the children looked at male and female pumpkin flowers and found pollen beetles moving around in them and also looked at some aphids, a common plant pest that feeds on plant sap.

The final activity used a TSN poster that combines very high magnification scanning electron micrographs with colour photos of plant parts. This allowed us to run a quiz in which the children match the plant micrographs to the photograph of the plant parts.

PLEASE SEND US STORIES OF YOUR SESSIONS, PREFERABLY WITH PHOTOS!

From Seed to Sandwich: where does our food come from?

Dr Phil Smith (JIC) and Mrs Maxine Woods (Hockley Primary)

For 2 days the sun shone and the Play Barn at Marsh Farm Country Park became our classroom and prep area. We worked with 5 groups of up to 60 Yr5/6 pupils on each day and the 30 min activity was followed by a 15 minute turnaround in readiness for the next group! During this time we worked our way through 400 baby-wipes and 400 paper-plates, cut 300 lengths of cotton twine, gave out 200 cotton reels and 200 syringe barrels and found a use for 70 cricket bat handles as combine harvesters! We spent our evenings over beer and pots of whelks reviewing the days activities - describing some of our young charges as 'lively' and 'challenging.' Before bed there was just time to watch a rerun of Fawlty Towers whilst cutting-out cardboard propellers which varied in shape from neat crosses through to symbols from Nazi-Germany. It was a brilliant few days, a tremendous buzz, exhilarating and exhausting all in one go and a unique opportunity to work as a partnership with a variety of pupils - more details at www.tsn.org.uk/news.

Funding for this project was given by BBSRC (School & Community Award) and a Royal Society Partnership Grant. TSN partners may be interested in applying to either organisation to fund a future project, further details on back page.



rupus from Hockley Primary preparing mini dough-ovens and threshing seeds from ears of wheat & barley, discovering where their food comes from ..

TSN Annual Meeting 2003

How likely was life to arise on Earth? - a talk by Prof. Andy Watson (UEA)

Last October, TSN hosted its Annual Meeting at which new & existing members had the opportunity to meet one another, swap stories over a glass of wine, claim quantities of surplus lab equipment and consider the evidence for life on Mars. Taking the Earth as a model for the Universe, a strategy that potentially introduces bias, Andy showed that simple life (bacteria) were relatively common, that complex life is rare, and alien-life even rarer. Mars, therefore, which once had water at its surface may well have possessed a primitive biosphere but we are probably alone in the Universe. Safe in this knowledge the refreshments were finished and our audience of approximately 70 people dispersed. Plans are already underway for this year's celebration - October 5th at the UEA.



Andy and Keith discussing life, the Universe and everything!



The New Year got underway in great style with TSN organising its 10th one-day MasterClass for high school teachers on February 9th looking at the Science behind Agriculture. For the first time we invited middle schools to the event (as requested at the Annual Meeting) and a total of 22 teachers from 13 schools attended the event which was generously hosted by the Institute of Food Research (IFR).

The morning's talks covered a diverse range of topics from organic agriculture, its mechanisms and effects upon wildlife, contrasting with the story of the route to the market-place taken by a new molecule shown to have insecticidal, herbicidal or fungicidal activity. Then followed talks about the properties of wheat proteins used in bread-making and the impact of research on day-to-day farming from the perspective of both arable & livestock agriculture.



Claire Pearson, Hellesdon High School, investigating the elasticity & extensibility of flour

It was fascinating to hear contrasting views from our speakers about some of these modern scientific issues. Our next challenge was to create some related practical activities for the afternoon. We resisted the temptation to organise a milking demonstration and the teachers used dough-washing to look at the amount and properties of the major bread-making proteins (gluten) in different flour samples. Additionally, microscope work was used to study some common plant diseases - both their symptoms and the diversity in structure of some of the causal agents.



The MasterClass team (L>R), Phil Smith (TSN), Martin Wolfe, Ben Gill, Phil Russell, Ian Foot, Dave Hart (TSN / IFR) pictured outside the IFR

The talks were presented by a high-calibre set of speakers - **Prof. Martin Wolfe**, research director of Elm Farm Trust who has 28 years research experience and now farms organically at Wakelyns Agroforestry in Suffolk; **Prof. Phil Russell**, an independent plant pathology consultant who worked previously for many of the agrochemical giants such as Schering and AgrEvo; **Mr Ian Foot**, an experienced plant breeder based at Nickersons (UK) Ltd in Bury St Edmunds, who has spent many years concentrating upon the factors controlling grain yield and bread-making quality in wheat; **Sir Ben Gill**, an active member of the government's research councils and a working Yorkshire farmer, recently knighted for his services to agriculture, conservation and community, speaking during his last 10 days as president of the National Farmers Union.

Primary Science Workshops



County Wide Coverage and New Ideas

Planning has begun for a new series of Primary Science Workshops (PSW). In response to your requests, the topics being considered are Electricity and Materials which will link to the new kits in the KitClub (see p3). Further information will be sent-out nearer the time.

The earlier workshop - Forces & Micro-organisms - has finally been taken out to the East and the West of the county with workshops in Lowestoft (July 2003) and King's Lynn (September 2003).

Such was the positive response in Lowestoft we were invited to Edgar Sewter Primary School, Halesworth, on a Staff Training day to run the workshop for their staff and those from their local cluster schools. **Is this something your school would be interested in hosting?** We feel it offers great potential for reaching an even larger audience and ensuring all primary staff are 'singing from the same song-sheet'.

Quotes from teachers on PSW's 4 & 5...

"A thoroughly enjoyable day - loads of ideas for class. Looking forward to the next course. One of the best courses I've attended"

"Every primary teacher should get the chance to go on it, many misconceptions are cleared-up."

"I feel encouraged to go back to school & teach areas that have always worried me before today."



TSN-on-Tour and National Science Week 2004

To celebrate this year's National Science Week, TSN joined forces with the member organisations of the Norwich Research Park to help host the DNA in the Garden (DNAitG) exhibit at the Forum in Norwich from the 10th - 22nd March. Family-friendly science activities ran on each Saturday, themed 'Garden Science' (13th) and Mothering Sunday Science (20th) and were planned jointly together with the BBSRC School & Community Links officer, Chantelle Jay (LH column). Chantelle then joined Phil on Tour, as TSN ventured out to some of our more rural schools with activities related to DNAitG for KS3. Pupils formed a 'model cell' involving all 30 pupils and drew comparisons between the organisation of a cell and their city, in a dramatisation of Norwich Cell City. Later, pupils extracted their own DNA from their cheek cells and had the opportunity to wear it around their neck in a necklace.



Pupils from N. Elmham trial the card idea



The interactive sunflower gets a talkin' to ..



DNA from an onion - honest!



A microscopic world is revealed



a cell membrane forms around the outside of the cell

Schools visited 'on the Tour' shown with stars, distribution of schools with active partnerships shown with yellow dots.



new products are formed inside the cell

this requires energy



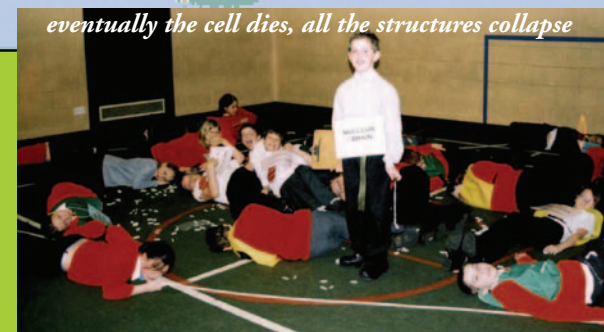
A cell contains liquid cytoplasm in which all the structures are bathed



the cell membrane contains tiny channels called pores / gates



raw materials enter, toxins kept out



eventually the cell dies, all the structures collapse



From cheek cell to pendant - DNA discovery!



DNA 50 celebrations for all

With the lack of local events to celebrate the 50th anniversary of the discovery of DNA, TSN organised a Biotechnology INSET session for teachers and acted as local organisers for the Genetic Futures event hosted later in the year

Pipetting, PCRing & Fingerprinting

Kits and resources abound, everyone is talking about Biotechnology and great ways to create relevant practicals in science, but unless you've tried the practical yourself are you going to embark upon it with it 24 Year 11's? This was the motivation behind a joint INSET day, organised by TSN, hosted by UEA's School of Education and run by Charles Hill from Wymondham College..

The day began with a micro-pipetting exercise - all the techniques that would follow involved the accurate use of these pipettes. Teachers then cut/digested a circular piece



of plasmid DNA, using restriction enzymes and ran the products of this digestion on an agarose gel which separates the fragments according to size. While enzymes incubated and gels ran, there was an opportunity for questions and the demonstration of the polymerase chain reaction (PCR). This technique underpins the vast majority of techniques in modern molecular biology and involves the amplification of large amounts of specific DNA fragments from extremely small amounts of starting material. The hardware for these techniques is now part of the TSN KitClub; further evidence of the stronger links between EDU and TSN (these are described on p3).



Gene Talk, Gene Play & Gene Dreams

Should we allow genetically modified (GM) plants to be used to help clean-up the environment?

Do you think it is right to bring a child into the world to save another life?

These were just two of the questions debated by KS4 pupils who attended the Genetic Futures event at the JIC in October 2003. The debate looked at the ethical and legal implications as well as the science behind such issues with the help

of TSN scientists, Wendy Harwood & Judith Irwin and Cambridge bioethicists Claudia Downing & Susan Wallace. The day was part of a national programme that visited 8 locations throughout the UK. TSN were the hosts and local organisers for the East of England event.

A total of 100 pupils (10 pupils from 10 different schools) across Norfolk & Suffolk attended this prestigious event which was coordinated by the School of Education at Sheffield Hallam University (SHU). In a busy day, the pupils then extracted DNA from their cheek cells and proceeded to wear it around their necks. Next, they attended a press conference briefing in which they were challenged to produce a newspaper story about fictional science in 2053. And finally they explored the possibilities of cloning a Woolly Mammoth or using gene therapy to improve sporting performance.

Dream Trip

Following-on from Genetic Futures in Norwich, pupils from two schools in our region were chosen by SHU to join a National gathering at the Royal Society bringing together schools from across the country. Pupils from Lynn Grove (pictured right) and Flegg High Schools proudly flew the East of England banner at a rare opportunity to visit the world's oldest scientific academy (founded 1660) and meet some of today's most eminent scientific personalities including Lord Robert Winston.

BEYOND CURIE



Illustrated are 3 women scientists: clockwise (from 12 o'clock) UEA ecologist Dr. Isabelle Côté, Dr. Helen Mason, a solar physicist from University of Cambridge and Dr. Catherine Merry, a cancer biochemist from the Paterson Institute, (University of Manchester). All three generously gave their time to talk both about their science and their experiences as women in 21st century science. Additionally, we invited Marie-Noëlle Barton from the Women Into Science & Engineering (WISE) campaign to speak briefly about potential careers in Engineering before chairing a panel debate. Approximately 150 pupils from 7 high schools attended the event. The panel were quizzed by the pupils about problems they had faced throughout their careers, gender-related or otherwise, and their inspirations for pursuing science as a career. Local scientists Dr. Tracy Palmer, Ruth MacCormack (JIC) and Emma Shore (UEA) also contributed to the debate ensuring all spheres of science, at all levels from undergraduate to project leader were addressed. The talks complemented an exhibit of famous women scientists since 1750 and our young panel ensured the pupils were able to see for themselves that today, many women are engaged in cutting-edge science - a situation that was not so common in the days of Marie Curie.



Lynn Grove's presentation at the Royal Society

Please remember to return kits in good order and on the day agreed (usually Thursday / Friday). If you want to extend the borrowing period you need to phone first to confirm that this is possible (01603 450619).

KITCLUB LATEST

Problems have arisen recently where kits are due out and have not been returned in time. We try to be as flexible as possible but sometimes there is very little leeway on kit turnaround... please help us, to help you.

New Additions

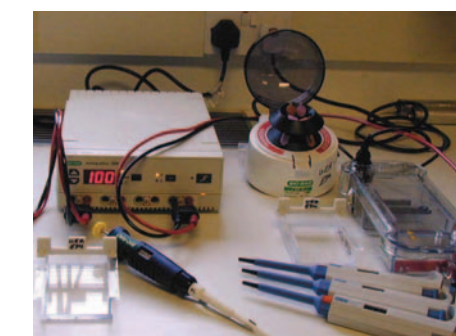
New kits since September 2003 -

1. General forces (duplicate);
2. Healthy Eating kit (duplicate).
3. Electricity;
4. Plant movement;
5. Biotechnology Hardware
6. Two extra magnification kits;

The new microscopes are proving very popular. They were subsidised by a grant from the Royal Microscopical Society (RMS) - details below. Microscopes can complement many topics, remember you can book-out more than one kit at any one time. Thank you RMS.

"A wonderful resource - what a range of items" (healthy eating)

£10K of Molecular Biology hardware - now available



We now have available a PCR machine, 8 gel tanks, 2 power packs and 20 pipettes which are essential elements for running molecular biology practical sessions. These items are just part of the resource that TSN has agreed to borrow from the School of Education, UEA, thus enabling more teachers to access them. The kit was originally supplied to EDU by Biorad at a cost of £10,000 and Caroline Still (EDU) has agreed a long-term loan to the KitClub. Thanks to Biorad and Caroline!

We hope to develop a simple set of resources to complement this equipment, feedback always welcome. Biorad are offering an introductory gene technology CPD day at JIC on 22nd June, for further details see www.explorer.bio-rad.com

Full list of kits at www.tsn.org.uk , under Support

Microscope Grant

The Royal Microscopical Society has grants available to help schools purchase their own microscopes.

The grants are for £20 per microscope. For further details email info@rms.org.uk

The RMS also has an excellent website <http://www.rms.org.uk>



"I used this (magnification) kit extensively for my wildlife club and during a science lesson - it's fantastic!"

Summer in Bungay

Who says all children want mobiles - not in Bungay Library!

Bungay Library has played host to items from the KitClub over the last two summers, and will be again this year. Library manager Andrew Milner explains why. "I knew of the work of TSN and had been looking for a way to boost the Summer Reading Game that most libraries run to encourage children to keep reading while schools are closed. In 2002 our numbers joining the game were up by 27% with the number of children finishing up by



"stunning views of the Moon, Jupiter and moons of Saturn" (telescope)

51%.

And again in 2003 when we borrowed the Sound Kit - the spy listening devices and tin can telephones proving a big hit - we again had over 100 children participating despite the hottest summer in years. I was delighted to invite Sheila & Phil along to the presentation of certificates & medals for those children who successfully completed the game." And we were delighted to attend, it's great that the kits don't gather dust over the summer.

Wanted

Golden syrup & treacle tins to make more string telephones! All donations gratefully received before our teeth fall out.

"Made the topic come to life" (friction & forces)